olume 55 Number 1/2 2003
ISSN 0001 25

Aslib Proceedings

New Information Perspectives

Knowledge production, consumption and impact: policy indicators for a changing world

Guest Editor: Dr Ian Rowlands

Emerald

Library Link
www.emeraldinsight.com/librarylink

Aslib imi
INFORMATION MANAGEMENT

www.emeraldinsight.com

Aslib Proceedings: New Information Perspectives
ISSN 0001-253X
©2003 MCB UP Limited

Aslib Proceedings: New Information Perspectives is a refereed journal of international repute that brings currency, authority and accessibility to the reporting of research, issues and debates in the broad area of information work.

Aslib Proceedings: New Information Perspectives is published in association with Aslib, The Association for Information Management.

Guest Editor Dr Ian Rowlands
Senior Lecturer, Department of Information Science, City University, London, UK
Editor Professor David Nicholas
Head of Department, Department of Information Science, City University, Northampton Square, London EC1V 0HB, UK. E-mail: nicky@soi.city.ac.uk
Editorial Manager Kay Nicholas
Research Administrator, Digital Consumer Health Research Project, Department of Information Science, City University, London, UK
Editorial Assistants Peter Williams
Research Fellow, Department of Information Science, City University, London, UK
Paul Huntington
Research Fellow, Department of Information Science, City University, London, UK
Managing Editor Diane Heath
Production Executive Jean Brown

Editorial Board
Ralph Adam
Freelance Journalist, City University, London, UK
John Akeroyd
Director, Learning Resources, South Bank University, London, UK
Peter Chapman
Information Consultant, Banbury, UK
Professor Peter Cole
Head of Department, Department of Journalism, University of Sheffield, UK
Dr Tom Dobrowolski
Senior Lecturer, Institute of Information Science and the Book, University of Warsaw, Poland
Harry East
Honorary Research Fellow, Department of Information Science, City University, London, UK
Professor David Ellis
Research Director, Department of Information and Library Studies, University of Wales, Aberystwyth, UK
Professor Ben Fouche
Head of Department, Department of Information Science, Stellenbosch University, Matieland, South Africa
Eti Herman
Vice-Director, Library, University of Haifa, Israel
Robin Hunt
Senior Vice President, Sterling Group, New York, USA
Nat Lievesley
Network Manager, Centre for Policy on Ageing, London, UK
Helen Martin
Information Manager, Research and Information Unit, The Guardian, *London, UK*
Anthony Watkinson
Publishing Consultant, Oxford, UK
Richard Withey
Director, Independent Digital, London, UK

This journal is also available online at www.emeraldinsight.com/ap.htm

Internet services available worldwide on URL www.emeraldinsight.com

Emerald
60/62 Toller Lane, Bradford,
West Yorkshire, England BD8 9BY
Tel +44 (0) 1274 777700
Fax +44 (0) 1274 785200
E-mail **help@emeraldinsight.com**

INVESTOR IN PEOPLE

Aslib Proceedings: New Information Perspectives is one of the 21 titles published in the field of Library and Information services that support Library Link. Library Link is a world-wide network that revolves around an Internet forum. Its remit is to be a valuable free resource to librarians. This includes providing detailed information on current issues within the field of Library and Information services and putting members in touch with like-minded individuals world-wide.
To become a member, access the Library Link Internet site at: http://www.emeraldinsight.com/librarylink
Other titles published by Emerald in the field and featured at the Library Link site are: *The Bottom Line: Managing Library Finances, Campus-Wide Information Systems, Collection Building, The Electronic Library, Forthcoming International Scientific and Technical Conferences, Interlending & Document Supply, Internet Research, Journal of Documentation, Library Management, Library Hi Tech, Library HiTech News, Library Review, New Library World, OCLC Systems & Services, Online Information Review, Performance Measurement and Metrics, Program: electronic library and information systems, Records Management Journal, Reference Reviews, and Reference Service Reviews.*

ISOQAR QUALITY ASSURED FIRM ISO 9002
UKAS QUALITY MANAGEMENT 028
Certificate number ...[illegible]......

Pre-press activities, comprising origination and pagination, associated with the publication of management journals

Regional offices:

For North America
Emerald, 44 Brattle Street, 4th Floor,
Cambridge, MA 02138, USA
Tel Toll free +1 888 622 0075; Fax +1 617 354 6875
E-mail **america@emeraldinsight.com**

For Japan
Emerald, Reina 308, 5-1 Sakae-cho, Kanagawa-ku,
Yokahama City, Kanagawa Prefecture, 221-0052 Japan
Tel +81 45 444 0388; Fax +81 45 444 0389
E-mail **japan@emeraldinsight.com**

For Asia Pacific
Emerald, 7-2, 7th Floor, Menara KLH, Bandar Puchong Jaya,
47100 Puchong, Selangor, Malaysia
Tel +60 3 8076 6009; Fax +60 3 8076 6007
E-mail **asiapacific@emeraldinsight.com**

Contact details
Customer helpdesk:
Tel +44 (0) 1274 785278; Fax +44 (0) 1274 785204;
E-mail **support@emeraldinsight.com**
Orders, subscription and missing claims enquiries:
Tel +44 (0) 1274 777700; Fax +44 (0) 1274 785200

Reprint service enquiries:
Carole Noble, Bradford
E-mail **cnoble@emeraldinsight.com**

Copyright permissions:
Charles Parker, Bradford
E-mail **cparker@emeraldinsight.com**

Missing issue claims will be fulfilled if claimed within four months of date of despatch. Maximum of one claim per issue.

No part of this journal may be reproduced, stored in a retrieval system, transmitted in any form or by any means electronic, mechanical, photocopying, recording or otherwise without either the prior written permission of the publisher or a licence permitting restricted copying issued in the UK by The Copyright Licensing Agency and in the USA by The Copyright Clearance Center. No responsibility is accepted for the accuracy of information contained in the text, illustrations or advertisements. The opinions expressed in the articles are not necessarily those of the Editor or the publisher.

Emerald is a trading name of MCB UP Limited

Printed by Printhaus Group Ltd, Scirocco Close,
Moulton Park, Northampton NN3 6HE

Aslil Proceedings
CUe-H64162-56-P023141

Aslib Proceedings: New Information Perspectives

Volume 55, Number 1/2, 2003 ISSN 0001-253X

Knowledge production, consumption and impact: policy indicators for a changing world

Guest Editor: Dr Ian Rowlands

CALCUTTA UNIVERSITY
CENTRAL LIBRARY

Contents

2 Access this journal online

3 Abstracts & keywords

5 **Knowledge production, consumption and impact: policy indicators for a changing world**
Ian Rowlands

13 **Information metrics and user studies**
Carol Tenopir

18 **(Mis)understanding the digital media revolution**
Richard Withey

23 **Digital information consumers, players and purchasers: information seeking behaviour in the new digital interactive environment**
David Nicholas, Tom Dobrowolski, Richard Withey, Chris Russell, Paul Huntington and Peter Williams

32 **Beyond outputs: new measures of biomedical research impact**
Grant Lewison

43 **Digital information provision via interactive television: understanding the digital consumer**
Barrie Gunter

52 **Comparing the use of two DiTV transmission services: same service, different outcomes**
Paul Huntington, David Nicholas and Peter Williams

64 **Home electronic health information for the consumer: user evaluation of a DiTV video-on-demand service**
Peter Williams, David Nicholas and Paul Huntington

75 **Modelling the diffusion of specialised knowledge**
Julian Warner

84 **Digital journals, Big Deals and online searching behaviour: a pilot study**
David Nicholas, Paul Huntington and Anthony Watkinson

110 Note from the publisher

Access this journal electronically

The current and past volumes of this journal are available at

www.emeraldinsight.com/ft

You can access over 100 additional Emerald journals, each with a comprehensive searchable archive of articles (many dating back to 1989), a detailed classification system and links to referenced material.

See page following contents for full details of what your access includes.

Emerald

Access this journal online

www.emeraldinsight.com/ap.htm

P23141

As a subscriber to this journal, you can benefit from instant, electronic access to the content of this title. Your access includes a variety of features that increase the value of your journal subscription.

Automatic permission to make up to 25 copies of individual articles

This facility can be used for teaching purposes, training courses, meetings or seminars. This only applies to articles of which Emerald owns copyright. For further details visit **www.emeraldinsight.com/copyright**

How to access this journal electronically

To benefit from electronic access to this journal you first need to register on the Internet. Registration is simple and full instructions are available online at **www.emeraldinsight.com/register**
Once completed, your institution will have instant access to the journal content from **www.emeraldinsight.com** or via the journal homepage **www.emeraldinsight.com/ap.htm**

Our liberal institution-wide licence allows everyone within your institution to access your journal electronically, thus making your subscription more cost-effective. Our Web site has been designed to provide you with a comprehensive, simple system that needs only minimum administration. Access is available via IP authentication or username and password.

Key features of Emerald electronic journals

Online Publishing and Archiving

You can gain access to past volumes as well as new material from this journal on the Internet via Emerald Fulltext. You can browse or search the database for relevant articles.

Key Reading

This feature provides abstracts of articles chosen by the journal editor on the basis of their subject-matter. These are selected to provide readers with current awareness of interesting articles from other publications within the same field.

Reference Linking

Direct links are provided from the journal article references to abstracts of the most influential articles cited (where possible this is to the full text of the article).

E-mail an Article

This facility allows you to e-mail relevant and interesting articles in PDF format to another PC for later use, reference or printing purposes.

Non-Article Content

The non-article content of our journals (product and materials information, industry trends, company news, etc.) is available online so that it can be accessed by users. It is possible to browse or search non-article content by keyword.

Additional Complementary Services Available

Your access includes a variety of features that add to the functionality and value of your journal subscription:

E-mail Services

Emerald's range of free e-mail alerting services is designed to deliver personal notification of news and features in a number of different interest areas.

Emerald WIRE (World Independent Reviews)

Emerald WIRE is a fully searchable, subject-specific database brought to you by Emerald Management Reviews. It provides article reviews from the world's top management journals. The database is updated monthly and gives users details of how to obtain the full text of original articles.

Research Register

Located at **www.emeraldinsight.com/researchregister**, the Emerald Research Register is an Internet research forum where you and your readers can identify information on research activity world-wide. This feature is invaluable if you are seeking information or wish to disseminate information about your own research.

Support Resources

Comprehensive librarian and user toolkits have been created to help you get the most from your journal subscription.
For further information about what is available visit **www.emeraldinsight.com/usertoolkit**

Choice of Access

Electronic access to this journal is available via a number of channels, enabling enc users and libraries to reach the content through their preferred delivery system. The Emerald Fulltext Web site – **www.emeraldinsight.com/ft** – is the recommended means of electronic access, as it provides fully searchable and high value-added access to the complete content of the journal.

Subscribers can also access and search the article content of this journal through the following journal delivery services:

EBSCOhost EJS
journals.ebsco.com

Huber E-Journals
e-journals.hanshuber.com/english/index.htm

Minerva
www.minerva.at

OCLC Firstsearch Electronic Collections Online
www.uk.oclc.org/oclc/menu/eco.htm

RoweCom's Information Quest
www.informationquest.com

SilverPlatter
www.silverplatter.com

SwetsBlackwell's SwetsWise
www.swetswise.com

Emerald Customer Support Services

For customer service and technical help, contact:
E-mail **support@emeraldinsight.com**
Tel +44 (0) 1274 785278
Fax +44 (0) 1274 785204

Emerald

Abstracts & keywords

Knowledge production, consumption and impact: policy indicators for a changing world

Ian Rowlands

Keywords Information management, Knowledge processes, Research, User studies

This paper provides a high-level overview of some of the main research themes and preoccupations that are reported in this special ciber issue of *Aslib Proceedings*. The research activities of ciber are drawn together in the quest for a better understanding of the policy implications of large-scale knowledge production systems against the backdrop of profound technical change, uncertainty over business models, and new forms of consumer behaviour. The paper presents a series of conceptual frameworks that aim to contextualise ciber's work in bibliometrics, cybermetrics, research evaluation, scholarly communication, user studies, publishing strategies and policy analysis. The transparency that metrics can bring to the evaluation debate and the pivotal role of human information behaviour in determining those metrics, are discussed.

Information metrics and user studies

Carol Tenopir

Keywords User studies, Methods, Methodology

Three questions – what can be studied; how can studies be done; and what can be measured – drive research methods and help to identify information metrics for user studies. User studies can investigate user needs, search strategies, or preferences. Observing and asking, the two main methods for conducting user studies, yield quantitative and qualitative data through studying patterns of behavior and insights into motivation. Ciber (Centre for Information Behaviour and the Evaluation of Research, City University, London) is in a good position to continue supporting information user behavior studies that use a variety of methods to gather both qualitative and quantitative data and help establish consistent metrics.

(Mis)understanding the digital media revolution

Richard Withey

Keywords Online retrieval, Information services, Consumer behaviour, Brand loyalty, Digital communications

Describes recent confusion about the nature of the digital revolution and the impact of this on commercial and academic behaviour. Illustrates that the nature of the digital revolution in consumer use of information has shown phenomenal uptake in usage, if not revenues and that this has already begun to change the nature of consumer behaviour. Argues that the power of the Web to disintermediate and provide scale economies could well apply to STM publishing models and that consequential changes could be significant.

Digital information consumers, players and purchasers: information seeking behaviour in the new digital interactive environment

David Nicholas, Tom Dobrowolski, Richard Withey, Chris Russell, Paul Huntington and Peter Williams

Keywords Digital communications, Electronic commerce, End-user computing, Information services, Interaction

Sketches the key characteristics of the newly information enfranchised general public (the digital information consumers). Portrays the digital consumer as all-conquering/powerful, short on attention, promiscuous, untrusting and – above all – interested in speed of delivery. Argues for a fundamental re-think of the concept of the information "user". The Web, search engines etc. are creating a level-playing field and a homogeneity which results in academics behaving more like the general consumer and the general consumer behaving more like an academic. Considers the overall outcomes and benefits of information acquisition.

Beyond outputs: new measures of biomedical research impact

Grant Lewison

Keywords Information science, Mass media, Research, International standards

Biomedical research evaluation has traditionally been based on analysis of outputs and their citations by other papers. However we should try to map the routes by which research actually improves patient care and reduces illness, and develop indicators for them. We must allow for the lengthy time-scales involved and the importance of researchers being physically close to healthcare professionals, whose practice can be improved through international and governmental regulations and through approved guidelines. Each of these will depend on a body of research evidence. We must also evaluate the effects of research on policy makers and the public, who often learn about it through the World Wide Web and through the mass media, particularly newspapers. The latter provide a major bibliometric resource but one that needs to be tapped in individual countries using common standards in order to provide internationally-comparable indicators.

Aslib Proceedings: New Information Perspectives
Volume 55 · Number 1/2 · 2003 · Abstracts & keywords
© MCB UP Limited · ISSN 0001-253X

Aslib Proceedings: New Information Perspectives
Volume 55 · Number 1/2 · 2003 · 3-4

Digital information provision via interactive television: understanding the digital consumer

Barrie Gunter

Keywords Digital communications, Information retrieval, Television, Interaction, Government departments, Dissemination, Health

To achieve its objective of having virtually all its services (central and local) online by 2005, the Government must close the "digital divide", i.e. provide access for those sections of society not yet linked to the electronic, computer-mediated communications environment. There is a need to consider user psychology as well as demography, as shown by research that has evaluated the use and effectiveness of health information and advice services provided via the television. The assumption is that simply providing access to online public services via the country's most widespread and popular mass medium will guarantee their success, but this assumption is naïve in terms of its understanding of viewer psychology. To ensure success, it is essential to know more about the usability and application effectiveness of interactive services provided through television. This paper explores key concepts of platform availability, use and access, service and information access, service use and application effectiveness.

Comparing the use of two DiTV transmission services: same service, different outcomes

Paul Huntington, David Nicholas and Peter Williams

Keywords Digital communications, Television, Metrics, Health service, United Kingdom, User studies

NHS Direct Digital was available to almost exactly the same number of users in both Hull and London via two different transmission DiTV companies: Kingston Interactive Television (KIT) and HomeChoice. This paper employs metrics based on server generated logs to compare use and user differences between the two services. Server logs that record user activity on a real-time and continuous basis were made available and used to make comparisons between the two services. The data were collected for both services over a similar period, February 2002 to May 2002. During this period the NHS Direct Digital service was visited by approximately 3,000 people and more than 5,000 NHS Direct videos were viewed. Making the study probably the largest analysis of health videos ever conducted.

Home electronic health information for the consumer: user evaluation of a DiTV video-on-demand service

Peter Williams, David Nicholas and Paul Huntington

Keywords Digital communications, Video, Information services, Education, Health care, User studies

Reports on a qualitative study exploring a highly innovative digital TV pilot service. Focus groups of medical and health information professionals, "condition-specific" subjects and "general interest" volunteers were recruited to obtain views about the videos generally, in terms of their content and presentation. Issues such as terminology used and the appropriateness of using video to deliver various types of information were also explored; the latter in the light of log statistics indicating relatively low use of videos as compared to text-based services. Results indicated that those who used the services tended to be avid seekers of information, who saw the service as a first port of call to obtain general information for wider consultation later. Differences emerged between medical professionals and the lay public regarding the use of language and involvement of patients in the videos. Text was regarded as a better medium for conveying some types of information, such as simple facts that might need to be consulted on a regular basis.

Modelling the diffusion of specialised knowledge

Julian Warner

Keywords Dissemination, Research, Science, Diffusion, Knowledge

This paper reviews developments from a study of the reception of the Research Assessment Exercise 1996. Research evaluation, including the value of citation analysis and the responsibilities attaching to publication of citation analyses, is considered. The distinctions made in the communication model for analysing reception, between dissemination and diffusion and between esoteric and exoteric media and communities, are developed further. Information transfer is represented as an explicable process. Possible further developments, including the appropriate relation to disciplines with related interests in the social communication of knowledge, are anticipated.

Digital journals, Big Deals and online searching behaviour: a pilot study

David Nicholas, Paul Huntington and Anthony Watkinson

Keywords Digital communications, Libraries, Electronic publishing, Online retrieval, Journal publishing

Evaluates, through deep log analysis, the impact of "Big Deal" agreements on the online searching behaviour of users of the Emerald digital library Web site, which provides access to more than 150 journals in the fields of business and information science. The purpose of the evaluation was to map the online information seeking behaviour of the digital library user and to see whether those signed-up to a Big Deal arrangement behaved any differently from the others. In general they did. The real surprise proved to be the strong consumer traits of the library's users. Research reported here refers to the first stage of a three-stage research project.

Knowledge production, consumption and impact: policy indicators for a changing world

Ian Rowlands

The author

Ian Rowlands is a Senior Lecturer at the Centre for Information Behaviour and the Evaluation of Research (ciber), Department of Information Science, City University, London, UK. E-mail ir@soi.city.ac.uk

Keywords

Information management, Knowledge processes, Research, User studies

Abstract

This paper provides a high-level overview of some of the main research themes and preoccupations that are reported in this special ciber issue of *Aslib Proceedings: New Information Perspectives.* The research activities of ciber are drawn together in the quest for a better understanding of the policy implications of large-scale knowledge production systems against the backdrop of profound technical change, uncertainty over business models, and new forms of consumer behaviour. The paper presents a series of conceptual frameworks that aim to contextualise ciber's work in bibliometrics, cybermetrics, research evaluation, scholarly communication, user studies, publishing strategies and policy analysis. The transparency that metrics can bring to the evaluation debate and the pivotal role of human information behaviour in determining those metrics, are discussed.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings: New Information Perspectives
Volume 55 · Number 1/2 · 2003 · pp. 5-12
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310462652

Background to this special issue

All the papers in this special double issue of *Aslib Proceedings: New Information Perspectives* are concerned with knowledge production, consumption and impact. They were first presented at a symposium held at The Bedford Swan Hotel, 24-26 July 2002, and represent the first corporate utterance of a new research group based at City University: ciber, the Centre for Information Behaviour and the Evaluation of Research. We are very grateful to Elsevier Science Limited and The Wellcome Trust for supporting the event, both financially and in kind.

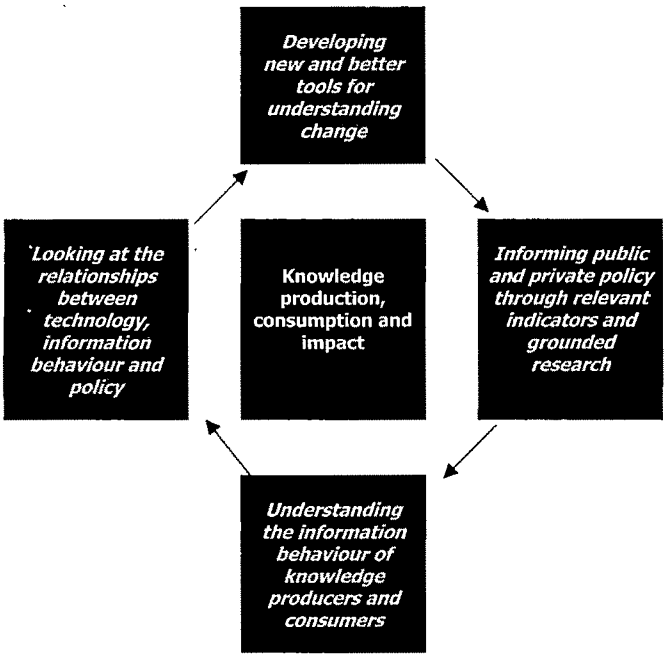
ciber is a policy-led, data-driven, think tank, which engages with issues at the interface between today's value-for-money, measurement-driven culture and the knowledge economy. The Centre's approach is highly interdisciplinary and draws on expertise in information science, bibliometrics, scholarly communication, research evaluation, Web monitoring, science policy, publishing strategies, new media, user studies, human-computer interaction, audience research and journalism. Current research projects include evaluations of consumer health information on digital platforms, studies of medical research outputs and their funding, young people's use of mobile phone for information delivery, the reporting of biomedical research in the newspapers, and the development of useage indicators for academic journal publishers and aggregators. These projects span the full breadth of the knowledge cycle, from research funding to impact evaluation. All are concerned with information metrics and indicators in areas of immediate application in public and private policy, with a distinct bias to health and healthcare. The aim of this paper is to contextualise the papers in this special issue within a broader and more comprehensive ciber framework so that the many common themes and links can be more readily appreciated.

A policy-led, data-driven research agenda

Much of ciber's research is led by the needs of decision makers in the public and private sectors who are striving to understand how to harness the knowledge production and consumption cycle to their best advantage. Central to ciber's research philosophy is the view that we can only understand the dynamics of this cycle properly if we take a balanced view of the interlocking relationships between technology, information behaviour and policy and how these forces shape knowledge production, consumption and impact (Figure 1).

Figure 1 represents a virtuous circle where policy questions drive grounded data collection and analysis, reflection, theory building and the development of new research questions and new indicators with which to tackle them. In the area of scholarly communication, for example, recent ciber work has addressed the notion of what journal "impact" really means and has proposed a new set of citation-based measures for representing the diffusion of ideas through the scientific literature (Rowlands, 2002). In an era of profound changes in scholarly communication, we need a much broader range of indicators to capture the subtleties of journal publication and reception than the bibliometrics community has hitherto recognised. Now that the user, previously the ghost at the bibliometrics feast, can be represented by the logs left behind by their browsing, searching and downloading behaviours (see the paper by Dave Nicholas and colleagues on "Big Deals" in academic publishing in this issue, pp. 84-109 (Nicholas *et al.* (2003b)), we are seeing the beginnings of a much more holistic understanding of the dynamics of the whole scholarly cycle.

Figure 1 A dynamic research agenda

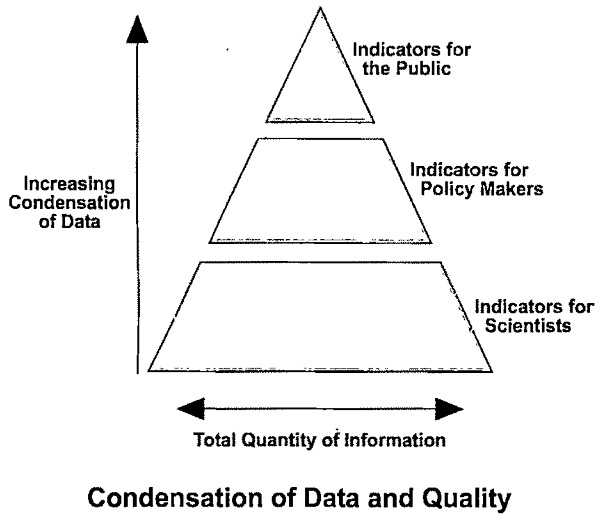

Developing new and better tools for understanding change
Informing public and private policy through relevant indicators and grounded research
Understanding the information behaviour of knowledge producers and consumers
Looking at the relationships between technology, information behaviour and policy
Knowledge production, consumption and impact

In some ways, the kinds of questions that ciber researchers ask will be very familiar to certain readers of this journal, especially those with an active interest in the library performance indicators movement. What resource inputs are available to meet the information needs of a given user population? How efficiently are those resources deployed? What is the ultimate value, what is distinctive, what is meaningful, what we are trying to do with those resources? How will users interact with our offerings, shaping, forming and transforming our ways of understanding their needs? How cost-effective are our investments in these activities?

What is different and unique about ciber is that it frames these questions not at the level of measuring the efficiency or effectiveness of the interlending services at the University of Poppleton, but at the level of corporate or national policy and within a context of a society where information is commonly recognised as a key lever of change. We take the view that there are important questions of public interest that need to be asked of scholarly communication systems, of public healthcare systems, of initiatives in e-government (see, for example, Barrie Gunter's discussion of the attempts of the Blair Government to close the "digital divide" in this issue, pp. 43-51 (Gunter, 2003)). Information products and services can now be configured simultaneously on the Web, on optical media, on handheld devices and mobile phones, on digital TV and even as print on paper. Information behaviour is changing as new opportunities present themselves, raising enormously significant issues. In this issue, we begin to grapple with some of these large scale, Big Picture, policy issues that effect us all. Measurement, and the implied transparency that metrics offer, is the common denominator.

ciber members have a common interest in mining large data sets with a view to extracting policy-relevant findings. The policy data pyramid (Figure 2) is a model that locates the production of indicators and other summary data within an action context that is designed to inform other specialists, policy makers and the wider public. Much of what ciber does can be understood in terms of reducing the complexity in high volume, sometimes ambiguous data, like Web logs, so that underlying truths can at least be glimpsed.

Figure 2 The policy data pyramid


Indicators for the Public
Indicators for Policy Makers
Indicators for Scientists
Increasing Condensation of Data
Total Quantity of Information
Condensation of Data and Quality

The advantages of objective and unobtrusive quantitative techniques such as bibliometrics are obvious, but they can potentially lead the researcher into a cul-de-sac where analysis is driven by what can practically be done with the data at hand, rather than responding to the kinds of questions that ought ideally to be asked. In essence, data mining is often tools-led rather than policy-driven, and this suggests some rather awkward questions:

- What do policymakers do with research information and indicators?
- How critical are they of their limitations?
- What kinds of indicators and research do policy makers really want?
- What would they ask for if they could start with a clean sheet?

In other words, what is measured and what ought to be measured?

Equally important, what are the information needs, information seeking behaviour and preferences of policy makers? How do they use policy-relevant information and research? These are important questions and so the attitudes and information behaviour of policy makers become legitimate topics for ciber research in their own right (see Strachan and Rowlands, 1997).

In this issue, Julian Warner (pp. 75-83) points out some of the limitations of indicator systems in a policy context, not least the danger of confusing description and value. Indicators are artificial constructs. As he points out, "citation counts [for example] are no more, and no less, objective than any other collective human activity" (Warner, 2003). This is a useful insight in the field of biblio- and cybermetrics, which have generally rather neglected the decision focus of the indicators they create. It is imperative that information metrics should be developed with a view to their relevance in decision making. They should aim to answer questions as directly as possible and form the basis for policy recommendations. Metrics and other data that do not perform this function become an end in themselves, offer no new insights, and quickly become isolated data geared to impress rather than inform. It is for these reasons that ciber places a great deal of emphasis on trying to understand the information behaviour that underpins the knowledge production cycle and the policy conditions within which it operates.

Beyond outputs to outcomes and impacts

Many of the frameworks traditionally used in evaluating library performance or national science policy emphasise resource inputs into the system (e.g. numbers of volumes held, national expenditures on civil R&D) and processes (e.g. costs of book processing, PhD completion rates) which address the efficiency with which those resources are utilised. The economic thinking, perspectives and terminology behind these indicator systems are by no means wholly appropriate or adequate when thinking about knowledge production, consumption and impact.

The economics of information are poorly understood, not least in relation to its public good and transformative characteristics. It all depends on whether you think information is a verb or a noun, whether information is just something you produce and consume or something that shapes how and what you think. There may be better models and frameworks, perhaps based on the communication and diffusion of specialised knowledge (see the paper by Julian Warner in this issue (pp. 75-83) which models information transfer through various esoteric and exoteric media (Warner, 2003)), or which reconceptualise our understanding of "user" not as a passive destination but as an active player in the consumption and transformation of knowledge (see Dave Nicholas and colleagues in this issue, pp. 23-31, on the notion of digital information players (Nicholas *et al.*, 2003a)).

Metrics can only provide an understanding of the knowledge production cycle on the physical plane, such as by counting numbers of documents, citations or downloads. The main purpose of knowledge production, creating understanding, can only be glimpsed indirectly. For this reason, metrics research needs to be triangulated with observation, survey and ethnographic techniques to provide the full picture (Pullinger and Baldwin, 2002). These issues and the need for a more holistic approach rooted in human cognition are explored in more depth in the paper by Carol Tenopir (2003) in this issue (pp. 13-17). Unexpected findings are reported in several papers in this issue when the real-life preferences and behaviours of information consumers are studied in depth (see the papers by Huntington *et al.* (2003), pp. 52-63, and Williams *et al.*, 64-74) evaluating the public's use and perceptions of consumer health information delivered on digital TV platforms.

Much more fundamental work needs to be done to develop a model of the knowledge production cycle that transcends "old economy" thinking, one that can more easily relate inputs and outputs to consumption, impact and changed human behaviour. In the meanwhile, ciber researchers have still found it useful to use a simple model to organise our thinking about the different kinds of indicators and other data that are needed to develop better, evidence-led, policies (Figure 3).

In this model, knowledge production is conceptualised as a "black box" that takes in inputs (e.g. research funding, skills, new ideas) and transforms them into outputs. An output is a tangible result of an activity: so, an academic research project may produce outputs in the form of a series of papers and patents. Since we are dealing primarily with informational outputs, the use and consumption of knowledge becomes a particularly important focus for ciber. Information consumption thus features as a strong theme in this issue.

An outcome is the principal goal of an activity, in this hypothetical case, a new invention: an outcome may thus incorporate a number of outputs. Impacts are quite different from outputs and outcomes. Outputs and outcomes are the discernible direct results of knowledge creation, as in the examples given: an article, a patent or an invention. Impacts are the broader and less immediate consequences that follow on from a paper or an invention, thus television has an impact on learning; mobile phones have an impact on teenage lifestyles. Impacts may occur over a long period of time. Work on information impact indicators is an exciting but underdeveloped area, but one in which ciber is increasingly being involved, and the reader of this issue is particularly directed to Lewison's programmatic paper (pp. 32-42) on the "downstream" outcomes and impacts of biomedical research (Lewison, 2003). He asks the deceptively simple question, "what are the links between research and better health?".

The integrated nature of the knowledge indicators model is useful in that it presents the big picture. For example, in the higher education sector, it becomes possible to think seamlessly about the policy inputs that facilitate knowledge production (like funding, access to library resources), outputs (like peer-reviewed research publications), consumption of supporting information services (e.g. JISC) and downstream research impact and quality measures, such as the national Research Assessment Exercises. We believe that this model is scaleable from a single information application right up to a national science system.

The research programme

Two overlapping, research themes have developed around ciber's early activities,

Figure 3 Knowledge production cycle indicators

UNDERSTANDING INFORMATION BEHAVIOUR AND SYSTEMS
+ APPROPRIATE MEASUREMENTS

Input Indicators	KNOWLEDGE PRODUCTION	output indicators	Consumption indicators	outcome indicators	impact indicators

= EVIDENCE-LED POLICIES

partly by design, partly adventitiously around some of the larger-scale projects: evaluating knowledge production systems, and understanding information behaviour.

Evaluating knowledge production systems

This research theme is concerned with the chains that link authors with readers through scholarly communication systems, that link health promotion agencies with digital health consumers through kiosks and other new technology platforms and, to express this idea at a more general level, the chains that link information creation, packaging, distribution and consumption. Essentially, this theme is concerned with understanding the digital transition and its impacts on knowledge dissemination. Completely new forms of knowledge production are emerging around electronic communication technologies such as the Internet. The digital transition is characterised by new kinds of documents (e.g. mobile text messages for health promotion), new kinds of repositories (e.g. e-print archives, digital libraries), new kinds of behaviour (e.g. hypertext linking, information foraging) and new kinds of business models (e.g. Big Deals, pay-per-view). These developments are radically reshaping the whole information landscape and creating fresh opportunities for revisiting "old" bibliometric models in the new networked information space.

The evaluation of these systems requires a fresh approach, one based on massive data collection, observation and grounded analysis since the models of the past are no longer a sure guide to the future. As we saw earlier, the needs of policy makers are pulling ciber well beyond the evaluation of knowledge production systems *per se* to trying to understand the wider outcomes and impacts of those systems. So, for example, do investments in health promotion impact on health outcomes, and can information provision change human behaviour? These questions suggest the need for a broader and more fluid range of methodological tools than researchers in the bibliometrics or cybermetrics communities have previously considered.

A key stumbling block in the evaluation of knowledge production is what is meant by "quality" and how the notion of quality can be glimpsed and condensed down to provide useful indicators. Ultimately, we have to concede that quality is unmeasurable. Who is the greater opera composer, Britten or Verdi? Who the greater theologian, Martin Luther or Thomas Aquinas? Who has contributed more to information retrieval theory, Karen Spark-Jones or Steven Robertson? While these may be interesting topics to debate, any notion of absolute quality is unworkable and better left to the philosophers and historians of the future.

We might do better to rethink quality as fitness-for-purpose, as a measure of satisfaction. This is how quality is commonly understood in contemporary management. This insight might lead us to the following seven-point model, or something like it, for understanding the quality of research (Table I). The model is based on the idea of a knowledge production life cycle, from an initial idea to its ultimate fulfilment, and in its current incarnation, the model is geared towards a better understanding of peer-reviewed scholarly journal publishing. However, we believe that the essential points of this model may be generalisable to other forms of knowledge production, such as new media publishing and work is in progress to develop a series of "sectoral" models.

As they progress through this cycle, information and knowledge demonstrate:

- increasing value;
- increasing consensus and social acceptance;
- increasing persistence; and
- increasing socio-economic impact.

The relevance of this model to ciber's activities can be exemplified by reference to one of our flagship projects, the Research Outputs Database (ROD). ROD is funded by The Wellcome Trust and a consortium of more than 30 medical charities and research councils. It is a database tool, based on ISI data, containing bibliographic details of all significant peer-reviewed biomedical research papers published by UK or Irish authors since 1988. Each paper in the database contains data elements, which relate to funding acknowledgements (an input indicator), publication details (outputs) and citation measures (an indicator of consumption by other researchers). ROD methodologies are being extended all the time, and Grant Lewison (2003) has been working especially on developing measures of outcome (for example, the citation of research papers in clinical guidelines, and the explicit incorporation of research findings into bedside treatments).

Table I The knowledge product life cycle

Research is ...	Whose needs are satisfied?	What are we dealing with?	Notes
Supported	Grant givers	Individual ideas (leading to research proposals leading to research grants)	In an abundance of individual ideas and scarce resources to support them, the best ideas rise to the top through a combination of self-censorship and by gaining the support of research funders
Published	Journal editors/referees	Publications	The best papers are published if they satisfy the requirements of peers. Almost by definition, this implies acceptance that the ideas are worthy of wider circulation
Cited	Research active scholars	Cited publications	The most useful papers are accepted by other research active scholars through citation: a direct measure of the degree to which the new ideas satisfy the needs of the research field
Read	Research active scholars/ other researchers and teachers/students	Readership	The papers with the broadest reach are read well outside the immediate field of study: by others within and beyond the discipline
Influenced	All in the above boxes, plus policy makers	Socially accepted ideas	Some of the ideas in these papers are so powerful that they have conceptual influence (they change the way others think), or instrumental influence (they change what others do). By virtue of the exposure they have received in getting this far, they have moved from being an individual's ideas to socially accepted ideas
Adopted	All in the above boxes, plus practitioners, entrepreneurs, consumers	Socially accepted technologies	Sometimes, these ideas find a practical social use and become embedded in practices, technologies or markets
Established	Whole cultures	Socially accepted orthodoxies	Eventually, papers are no longer published, read, cited or influential (like gravitational theory) they are simply accepted as part of the fabric ... until challenged

Understanding information behaviour

This research theme is about the world of the empowered information consumer, interactivity and the next generation of knowledge platforms. The current transition from print to an increasingly bewildering array of electronic sources, distribution technologies, and new information applications suggests some crucial questions for scholars, policy makers, investors and citizens alike – from how to price information to how to evaluate quality in the permissive publishing environment of the Internet. The statistics of the new digital interactive environment are pretty amazing (this issue, *passim*). Information and communication technologies are reconfiguring every aspect of the knowledge cycle:

> Electronic scholarly communication is reaching critical mass, and we are witnessing qualitative and quantitative changes in the ways that scholars communicate with each other for informal conversations, for collaborating locally and over distances, for publishing and disseminating their work, and for constructing links between their work and that of others ... The cycle of scholarly activities is blending into a continuous, looping flow, as people discuss, write, share, and seek information through networked systems (Borgman and Furner, 2002).

> Excited by what has now become possible, participants in the creation of the new digital library often overlook fundamental (often implicit) aspects of the paper paradigm that still need to be maintained in the digital universe. In the realm of scholarly and scientific communication, thus issues of first publication, version control, referencing version control, referencing, stable and immutable archives, as well as strategic issues blurring the distinctions between the information players all have to be reconsidered (Mabe, 2001).

Despite the "hard" scientific methodologies and terminologies employed by infometricians, it should never be forgotten that knowledge production, consumption and impact are social phenomena that are fundamentally shaped and determined by human behaviour: affective, cognitive and sensorimotor aspects all play a role here. Humans are creatures of habit, leaving behind them trails of information behaviour evidence that often reveal striking statistical regularities. These patterns and the underlying human behaviours that give rise to them, form the subject matter of information metrics. Bibliometric "laws" are human-centred distributions, not natural laws. They reveal the behaviour patterns of populations of information users and producers, their likes, dislikes, reading habits and perceptions (Mabe and Amin, 2002) and they offer a unique glimpse into the social psychology of knowledge production and consumption.

Recent technical developments in the knowledge production cycle suggest some fundamental overarching questions. How much has human behaviour really changed? Are we witnessing a revolution, or a co-evolution of technology and behaviour? (See the paper by Withey (2003) in this issue, pp. 18-22.) Although we do not yet have many clearly formulated questions, let alone answers, it is blindingly evident that we cannot understand information processes without first understanding human behaviour. We need a much better understanding of the reasons how and why people browse, forage, interact and consume and subsequently utilise electronic information. We also need a better understanding of the reward systems that motivate and shape information and its production. The importance of human behaviour in the context of ciber's activity manifests itself at many levels. We know for example that league tables, performance indicators and other forms of evaluation have a profound impact on the way that organisations and employees behave. Talk to a teacher about Ofsted inspections or to a medical school librarian about journal impact factors! More fundamentally, bibliometricians have suspected for many years that their straight log-linear plots, hyperbolic distributions and "laws" must be grounded in the habits and regularities of the interactions between authors, referees, journal editors and readers. Similar patterns are emerging from studies of Bradfordian subject concentration on electronic bulletin boards, or from the Zipfian surfing behaviour of people navigating the World Wide Web (Rowlands, 2000).

In summary

Bibliometrics research, after a long period in the doldrums, is becoming more and more relevant to questions of public and corporate policy in an information- and outcomes-obsessed society. The focus is shifting from an introverted and self-reflexive concern with simply summarising and condensing the content aspects of large databases (text mining) to an approach that explores profound questions about information behaviour, motivation and value. Central to ciber's research ethic is that bibliometrics, and latterly cybermetrics, are keys to unlocking the secrets of information behaviour. The context of information metrics research has broadened to encompass knowledge production, consumption and impact as primarily social rather than technical phenomena. It is wising up. The opportunities for differentiating information delivery by media, by demographic characteristics, by retrieval and browsing preferences, and by business model suggested by the research findings presented in this issue raise some fascinating research questions for the future with a policy resonance that has not previously been tackled within the information science tradition.

Guest Editor's note

In addition to the authors of the papers appearing in this issue, the following took part in the symposium:

- Nadia Azzouzi (The Wellcome Trust);
- David Brown (The British Library), Chair of session;
- Josie Maria Griffiths (University of Pittsburgh);
- Don King (University of Pittsburgh);
- Eti Herman (University of Haifa), Rapporteur;
- Michael Mabe (Elsevier Science Ltd);
- Michel Menou (City University), Rapporteur;
- David Pullinger (UK Census Office);
- Lyn Robinson (City University); and
- Iain Stevensen (City University).

References

Borgman, C. and Furner, J. (2002), "Scholarly communication and bibliometrics", *Annual Review of Information Science & Technology*, Vol. 36, pp. 1-40.

Gunter, B. (2003), "Digital information provision via interactive television: understanding the digital consumer", *Aslib Proceedings*, Vol. 55 Nos 1/2, pp. 43-51.

Huntington, P., Nicholas, D. and Williams, P. (2003), "Comparing the use of two DiTV transmission services: same health information service, different outcomes", *Aslib Proceedings*, Vol. 55 Nos 1/2, pp. 52-63.

Lewison, G. (2003), "Beyond outputs: new measures of biomedical research impact", *Aslib Proceedings*, Vol. 55 Nos 1/2, pp. 32-42.

Mabe, M. (2001), "Digital dilemmas: electronic challenges for the scientific journal publisher", *Aslib Proceedings*, Vol. 53 No. 3, pp. 85-92.

Mabe, M. and Amin, M. (2002), "Dr Jekyll and Dr Hyde: author-reader asymmetries in scholarly publishing", *Aslib Proceedings*, Vol. 54 No. 3, pp. 149-57.

Nicholas, D., Dobrowolski, T., Withey, R., Russell, C., Huntington, P. and Williams, P. (2003a), "Digital information consumers, players and purchasers: information seeking behaviour in the new digital interactive environment", *Aslib Proceedings*, Vol. 55 Nos 1/2, pp. 23-31.

Nicholas, D., Huntington, P. and Watkinson, A., (2003b) "Digital journals, Big Deals and online searching behaviour: a pilot study", *Aslib Proceedings*, Vol. 55 Nos 1/2, pp. 84-109.

Pullinger, D. and Baldwin, C. (2002), *Electronic journals and User Behaviour*, Deedot Press, Cambridge.

Rowlands, I. (2000), "Who can count the dust of Jacob? From bibliometrics to cybermetrics", in Nicholas, D. and Rowlands, I. (Eds), *The Internet: Its Impact and Evaluation*, Aslib, London, pp. 114-30.

Rowlands, I. (2002), "Journal diffusion factors: a new approach to measuring research influence", *Aslib Proceedings*, Vol. 54 No. 2, pp. 77-84.

Strachan, J. and Rowlands, I. (1997), "Information for policy-making", in Rowlands, I. (Ed.), *Understanding Information Policy*, Bowker-Saur, London, pp. 61-73.

Tenopir, C. (2003), "Information metrics and user studies", *Aslib Proceedings*, Vol. 55 Nos 1/2, pp. 13-17.

Warner, J. (2003), "Modelling the diffusion of specialised knowledge", *Aslib Proceedings*, Vol. 55 Nos 1/2, pp. 75-83.

Williams, P., Nicholas, D. and Huntington, P. (2003), "Home electronic health information for the consumer: user evaluation of a DiTV video-on-demand service", *Aslib Proceedings*, Vol. 55 Nos 1/2, pp. 64-74.

Withey, R. (2003), "(Mis)understanding the digital media revolution", *Aslib Proceedings*, Vol. 55 Nos 1/2 , pp. 18-22.

Information metrics and user studies

Carol Tenopir

The author

Carol Tenopir is a Professor at the School of Information Sciences, University of Tennessee, Knoxville, Tennessee, USA. E-mail: ctenopir@utk.edu

Keywords

User studies, Methods, Methodology

Abstract

Three questions – what can be studied; how can studies be done; and what can be measured – drive research methods and help to identify information metrics for user studies. User studies can investigate user needs, search strategies, or preferences. Observing and asking, the two main methods for conducting user studies, yield quantitative and qualitative data through studying patterns of behavior and insights into motivation. ciber (Centre for Information Behaviour and the Evaluation of Research, City University, London) is in a good position to continue supporting information user behavior studies that use a variety of methods to gather both qualitative and quantitative data and help establish consistent metrics.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings: New Information Perspectives
Volume 55 · Number 1/2 · 2003 · pp. 13-17
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310462661

Introduction

Information metrics in user studies can be examined from the specific viewpoint of identifying and listing individual measurable data points (variables) or from the broader viewpoint of understanding how the research method selected determines what can be measured. This paper takes the latter, broader approach. Wang (2001) takes an even broader approach that focuses on research methods and methodologies. There are three fundamental questions related to this broad approach to user studies and information metrics:

(1) What can be studied?
(2) How can each of the items identified be studied?
(3) What can be measured?

Although these may seem rather simplistic at first glance, the answers to these questions drive research and research methodologies.

Background

To understand what can be studied requires some brief background on user studies in information retrieval. Research on human factors in information access, retrieval and use has gained popularity over the last two and a half decades, in particular in the last decade. This is in contrast to the earliest days of information retrieval, when researchers focused on aspects of retrieval systems other than the human in their attempt to evaluate retrieval performance or improve online systems. Studies focused on the vocabulary used in indexing and abstracting, on the type of text being searched (full text or bibliographic), and on the powers of the search engine. Each of these things is important to test, yet another important factor was being left out: the user. It took some time for researchers to realize that the person sitting at the keyboard might have something to do with the success or failure of a search and how users judge and use the information is as important as how they search for it.

Studies of human factors in information retrieval came into their own in the early 1980s when researchers such as Fenichel, Bellardo, Bates, Saracevic and others began to look at how individual characteristics of intermediary online searchers might influence their searching style or their online success on traditional online systems such as Dialog (Hewins, 1990; Harter and Hert, 1998). Only a few studies looked at end-user performance, such as the study by Borgman (1989) on how college students interacted with online public access catalogs.

Early studies were almost always conducted on bibliographic databases on Boolean logic systems with command interfaces. They focused mostly on information seeking patterns rather than what the user did with the information they located. Collectively these studies tested many characteristics of individuals that might account for how people interact with information systems, and although they reached no firm consensus on which characteristics were most important, they laid the groundwork for future studies.

A newer generation of human studies has focused more on end users and how they interact with information from the time of identifying an information need, through seeking, retrieval, and use of the information. These later studies cover a variety of systems, including the same Boolean logic commercial systems used in earlier studies, but also various Web search engines and other search systems.

These later studies can be described as being of two types: first, the micro/holistic approach, and second, the macro/longitudinal approach. Holistic studies are typified by researchers such as Kuhlthau, Ingwersen, Wang, and others who are working to develop models of the total process of human interaction with information systems (Wang, 2001).

Models, such as those by Ingwersen (Figure 1) and Wang (Figure 2) show human interaction with information systems as a complex multidimensional process that involves many aspects of an individual's cognitive processes as well as aspects of the information system. A model is developed through observation and experimental studies and is then tested and refined. Creating better models of the entire information retrieval and use process is the focus of these holistic studies.

Another current group of researchers approach human factor and information retrieval interaction studies from both a more quantitative and longitudinal approach. Researchers in this group of studies include Tenopir and King, Pullinger, Mabe, Borgman, and others who survey or observe studies often look at changing patterns over time to help predict the future and may predict behavior based on large numbers of responses to surveys or interviews, rather than experimental studies of relatively few individuals (King and Tenopir, 2001; Borgman, 1996; Mabe and Amin, 2002).

Macro studies that are longitudinal most often survey large random samples of different individuals within the same user group (scientists within universities, for example) over time to make general observations or predictions of change (Tenopir and King, 2000). Less commonly, smaller studies may follow the same individuals over time (Borgman *et al.*, 1989). Macro/longitudinal studies allow researchers to depict broad patterns of behavior and how those patterns may change over time, such as the amount of time spent reading articles and number of article readings by scientists, social scientists and engineers as depicted in Figure 3.

What can be studied?

The possibilities are infinite when it comes to studying human beings. Studies of user interaction with information can focus on any aspect of the information process and on the many roles a user performs. Comparing survey data with transaction log analysis can provide a double-check for measuring what people actually do and begin to answer the questions of both what people do and why.

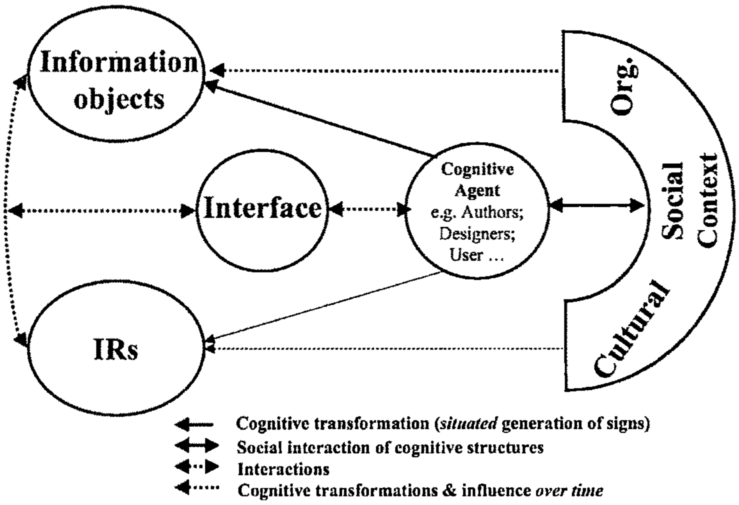
In the role of information seekers and users or readers we can study:

- User needs/search topics (what do people intend to search for, how do they express those needs, how do those needs change over time?).
- Search strategies (how do they pose strategies and interact with systems and with intermediaries, how do those strategies/interactions change, what difficulties do they encounter, how can publishers and librarians assist in this process, and searching style?).
- Factors that affect strategies/interaction (how do individual differences, situational, emotion, tasks, etc. change, how and what people search for and use, or their satisfaction with results?)

[redacted]

Aslib Proceedings: New Information Perspectives
Volume 55 · Number 1/2 · 2003 · 13-17

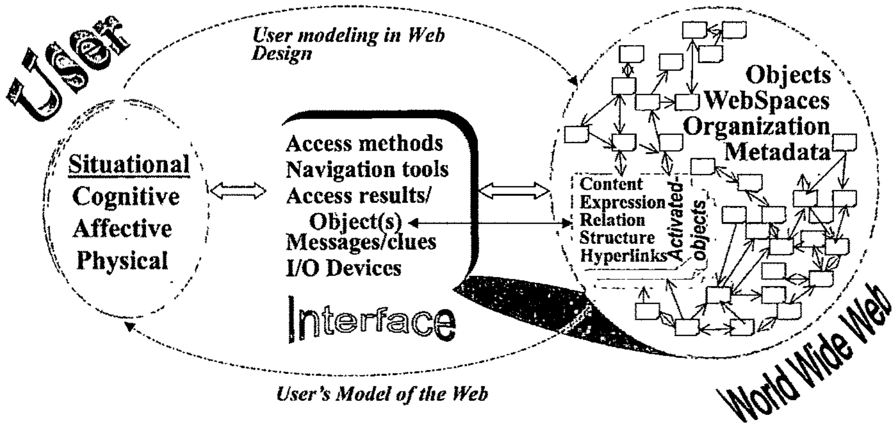
Figure 1 Ingwersen's cognitive model of information seeking and IR interaction


Information objects
Interface
IRs
Cognitive Agent e.g. Authors; Designers; User ...
Org.
Social Context
Cultural
Cognitive transformation (*situated* generation of signs)
Social interaction of cognitive structures
Interactions
Cognitive transformations & influence *over time*

Source: Ingwersen and Järvelin (2002)

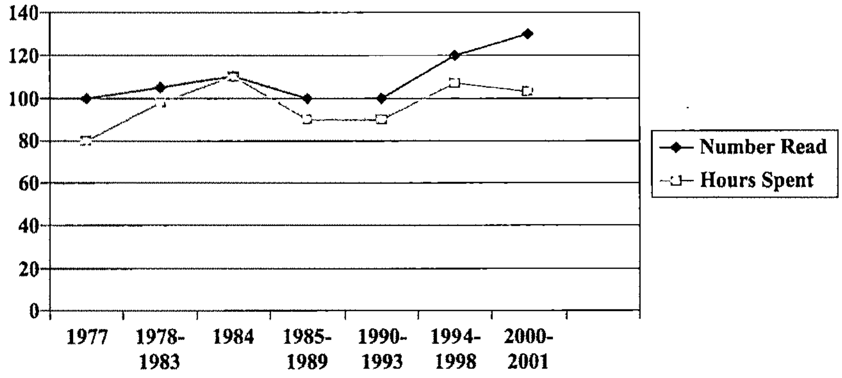
CALCUTTA UNIVERSITY
CENTRAL LIBRARY

Figure 2 A multidimensional model of user-Web interaction in IR



Source: Wang (2001)

Figure 3 Time spent and number of article readings



Source: Tenopir and King (2000)

- Preferences (what do they like, what do they say they like?).

In the role of author/creator of information we can add:

- Preferences/needs (what do they say motivates them to choose a source for publishing or disseminating their work?).
- Where do they choose to publish or disseminate their work (what do they actually do?).
- How do these factors vary by discipline, situation, and other factors?

How can studies be done?

Deciding what can be studied is just the first part of the problem. What can be measured is, of course, dependent upon the methodology used. There are many possible methodologies for user studies (see Wang, 2001 for an extensive overview), but there are two main methods that dictate what is measured. Simplistically, these two methods are: observing and asking.

Observing can include such specific methodologies as:

- Query logs.
- Verbalization (concurrent ("think aloud") or retrospective).
- Journals.
- Usability testing.

Asking may be done through interviews or questionnaires and includes such methods as:

- Surveys (to a random sample or self-selected participants).
- Focus groups.
- Critical incident technique (asking a respondent to focus on a specific incident, such as the last time he or she read a research article).
- Recollection.
- Preferences/opinions.
- Thought experiment (having someone "bluesky" as to what if).

What can be measured?

Specific measures or metrics for all of these can be put in the simplest terms as:

- What people do.
- What people prefer.
- What people say they do.
- What people say they prefer.
- What they may do or prefer in the future.

What people do can be measured in several ways, including surveys that ask them what they do, experimental observations of what they do in specific situations or focusing on specific variables, case studies that observe selected user behavior, or transaction log analyses. Survey questions can ask directly what someone does (for example, how many articles, reports, and books did you read last year?), or use the critical incident technique to help them focus on a specific incident and answer questions in that context (for example, think about the last thing you read for work and describe it). Both approaches are valid for different levels of questions and are often mixed in the same study for cross-comparison purposes.

What people say they want is less useful than what they actually do or will do, but has some value nevertheless. I have used almost all of these methods and am the most skeptical of the value of the information I get from studying stated preferences/opinions. I would much rather measure what people do in a given situation, rather than ask them what they prefer. Preferences are useful within a given context (i.e. do you prefer this interface or that one and why), but are less useful with novice respondents out of context (i.e. what do you want in an interface). It is, however, useful to measure what users actually do versus what they say they prefer. Focus groups, case studies, interviews, and surveys that ask participants to rank or rate specific items are most useful methods for measuring preferences.

Well-designed human studies include both quantitative and qualitative data gathering and analysis. Researchers need to have both of these to provide the most reliable insights into information behavior. Although preference data can be quantified (asking people to rate their preferences on a scale of one to five, for example, and ranking preferences by averages), quantitative data from surveys or experiments is particularly useful for measuring what people actually do.

Qualitative analysis is more useful for measuring what people want or say they want and for answering why they behave in a certain way. Careful reading of open-ended questions or probing interviews can reveal motivations and the differences between what people say they want and what they will really find useful (Watson, 1998).

Conclusions

Whether using standard experimental techniques, surveys, or other observations, research funders and centers such as ciber should encourage projects that will provide both insights into patterns of behavior of user groups and those that provide insights into motivations. Insights into patterns of behavior of users and user groups is best done by quantitative data gathered in a rigorous way, while insights into motivations are best done by qualitative data and drawing meaning from those data. Recent studies have demonstrated that there are identifiable patterns in information behavior, but those patterns vary considerably by factors such as subject discipline, workplace, motivation, purpose, and many other factors (Tenopir and King, 2000; Pullinger and Baldwin, 2002). We are finding that all aspects of human behavior – affective, cognitive, and sensorimotor – have an influence on how people interact with information. Finally, research has shown that users may change their habits and expectations with changing situational factors (Wang, 2001).

From studies conducted to date we are beginning to build a body of conclusions that will help direct information system design for the future and the beginnings of a set of consistent, user-centered metrics, but there is much work left to be done in the future. Research centers such as ciber are playing an important role in encouraging and conducting studies that use a variety of techniques, collect both quantitative and qualitative data, build on other studies, and provide a longitudinal view of user behavior.

References

Borgman, C.L. (1989), "All users of information systems are not created equal: an exploration into individual differences", *Information Processing and Management*, Vol. 25 No. 3, pp. 237-52.

Borgman, C.L. (1996), "Why are online catalogs still hard to use?", *Journal of the American Society of Information Science and Technology*, Vol. 47 No. 7, pp. 493-503.

Borgman, C.L., Case, D.O. and Meadows, C.T. (1989), "The design and evaluation of a front end user interface for energy researchers", *Journal of the American Society of Information Science and Technology*, Vol. 40 No. 2, pp. 99-109.

Harter, S.P. and Hert, C.A. (1998), "Evaluation of information retrieval systems: approaches, issues, and methods", in Williams, M.E. (Ed.), *Annual Review of Information Science and Technology*, Vol. 32, Information Today, Medford, NJ, pp. 3-94.

Hewins, E.T. (1990), "Information need and use studies", in Williams, M.E. (Ed.), *Annual Review of Information Science and Technology*, Vol. 25, Elsevier Science, New York, NY, pp. 145-72.

Ingwerson, P. and Jarvelin, K. (2002), "The turn: integration of information seeking and information retrieval in context", paper presented at Integrating Information Seeking and IR. Fourth Libraries in the Digital Age Conference, 21-24 May, Dubrovnik

King, D.W. and Tenopir, C. (2001), "Using and reading scholarly literature", in Williams, M.E. (Ed.), *Annual Review of Information Science and Technology*, Vol. 34, Information Technology Today, Medford, NJ, pp. 423-77.

Mabe, M.A. and Amin, M. (2002), "Dr Jekyll and Dr Hyde: reader asymmetries in scholarly publishing", *Aslib Proceedings*, Vol. 54 No. 3, pp. 149-57.

Pullinger, D. and Baldwin, C. (2002), *Electronic Journals and User Behaviour: Learning for the Future from the SuperJournal Project*, Deedot Press, Cambridge.

Tenopir, C. and King, D.W. (2000), *Towards Electronic Journals: Realities for Scientists, Librarians, and Publishers*, Special Libraries Association, Washington, DC.

Wang, P. (2001), "Methodologies and methods for user behavior research", in Williams, M.E. (Ed.), *Annual Review of Information Science and Technology*, Vol. 34, Information Technology Today, Medford, NJ, pp. 53-99.

Watson, J. (1998), " 'If you don't have it, you can't find it'. A close look at students' perceptions of using technology", *Journal of the American Society for Information Science and Technology*, Vol. 49 No. 11, pp. 1024-36.

(Mis)understanding the digital media revolution

Richard Withey

The author

Richard Withey is Global Director-Interactive Media at the Independent News & Media, London, UK.
E-mail: richard.withey@indigital.co.uk

Keywords

Online retrieval, Information services, Consumer behaviour, Brand loyalty, Digital communications

Abstract

Describes recent confusion about the nature of the digital revolution and the impact of this on commercial and academic behaviour. Illustrates that the nature of the digital revolution in consumer use of information has shown phenomenal uptake in usage, if not revenues and that this has already begun to change the nature of consumer behaviour. Argues that the power of the Web to disintermediate and provide scale economies could well apply to STM publishing models and that consequential changes could be significant.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings: New Information Perspectives
Volume 55 · Number 1/2 · 2003 · pp. 18-22
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310462670

Introduction

The upturns and downturns of the digital revolution of the 1990s and early part of this century are well rehearsed. Economic historians will tell us in time just how significant the dotcom bubble was in influencing the nature of the subsequent world recession: it certainly seems to have given it some shape. With four false starts so far in the recovery cycle (as of early October 2002) compared to a total of five in the 1930s recession, this is looking less like a "V" shaped recession, or a "U" shaped one, and more like a "WWW" shaped one.

Because the hype was so hyper and the subsequent low has been so low (particularly in the media industry, which could be why you have heard so much about it) some industry watchers have become a little confused as to what is actually going on in terms of digital conversion. By and large, the early pundits of the digital "new economy", including some major consultancies, got the financial and economic indicators of growth spectacularly wrong. Interestingly, however, they got the numbers of users actually adopting these new technologies in their everyday business and personal lives pretty much right. So we now find ourselves, towards the end of 2002, with a digital economy that reaches half a billion people worldwide, and where in the UK over 21 million users are online (see Table I), and with an industry that, in global terms, is not yet worth a damn. This has caused many consumer information industry watchers and providers to write off the digital channels as an overblown threat that has gone away, perhaps forever, but the key word in the preceding sentence is "yet". Tables II-IV give some indication of the size of expansion of the audience for online information.

Table II shows that one of the reasons that growth in digital use may still be being misrepresented is that users are, by and large, a bit younger than those who write about them. Almost 75 per cent of Web users in the UK, for example, are under 50.

Table III shows that ABC1 socio-economic groups also still dominate adoption. Although this picture changes significantly for digital TV penetration in the UK (see Table IV).

Table I Online penetration in the UK

Per cent	
Gender	
Male	59.55
Female	40.45
Access from:	
Home	66
Work computer	29
Mobile phone	4
PDA	1
Total number	21,392,051

Source: Nielsen/NetRatings (2002)

Table II Age profile of Web users

Age	Per cent of users
2-11	4.20
12-17	9.06
18-20	3.59
21-24	4.58
25-34	20.33
35-49	30.72
50-54	11.73
55-64	10.47
65-99	5.31

Source: Nielsen/NetRatings (2002)

Table III Usage of the Web by socio-economic group

Group	Per cent
AB	36
C1	33
C2	18
DE	14

Source: e-Mori Technology Tracker (2002)

Table IV Usage of the TV by socio-economic group

Group	Per cent
AB	44
C1	43
C2	46
DE	34

Source: e-Mori Technology Tracker (2002)

Hyper growth driven by the USA has now peaked and in fact Europe and Asia are now outstripping the growth in Internet usage in the USA:

> The number of people that have access to the Internet from their homes reached 498 million by the end of 2001. Fastest growth was in Asia, which saw a 5.6 per cent increase in home connections in the last quarter of 2001 compared to the previous quarter. Next was Europe, which saw a 4.9 per cent quarterly increase, then the US, up 3.5 per cent, and Latin America, up 3.3 per cent (Nielsen/NetRatings, 2002).

Some early lessons

Even from this brief overview, therefore, a picture emerges of a media delivery channel that reaches a significant proportion of citizens in the world's developed economies; and that is now beginning to grow faster in Second and third world economies where growth is fuelled by affluent younger people but also where digital TV, in those few areas of the world in which it has made any impact, could become a key vehicle for digital take-up across all age and socio-economic groups. Moreover the evidence from the USA is that higher levels of broadband access from the home increase time spent on the Web significantly:

> "Online activity picks up in July as overall audience levels dip", 20 August 2002, Patrick I. Thomas, author. Overall traffic for the US at-home and at-work active Internet universe fell slightly in July, while page view and time spent metrics crept higher. Falling mortgage rates and a healthy home/apartment-buying season culminated in a substantial spike in traffic for the Home & Realty sector. Hotels.com watched its audience levels soar, due in part to a high profile media blitz that enticed consumers searching for travel accommodations online. The reality hit *Big Brother 3* generated a surge in traffic for CBS, as captivated admirers snooped for additional content on the remaining members of the house. Broadband penetration continued its ascent, inching upward 0.8 percent over last month; surpassing 26.4 million active users (Nielsen/NetRatings, 2002).

Such astonishing growth over a short period may be fairly viewed with scepticism by those charged with interpreting its commercial significance, but they would be unwise to be cynical about it, though many are. The fact is that there is already clear evidence that exposure to strong and readily available digital channels changes consumer behaviour in some key areas that relate to information gathering. Admittedly, the observed changes described here largely relate to consumer media consumption, but those academics who deny that generalist media consumption bears no relationship to more specialist information channels may be in for a rude awakening.

Creating the promiscuous consumer

The effect of using digital channels for information retrieval can be characterised as changing them from "users" to "consumers" and more particularly "promiscuous consumers", whose somewhat promiscuous behaviour has been described by

David Nicholas and others as having "the makings of the biggest information bang ever (but some of us are deaf)" (Nicholas *et al.*, 2002) and more extensively by Bayler and Stoughton who describe digital consumers as "highly demanding, unsentimental, and generally unwilling to assign loyalty" (Bayler and Stoughton, 2002, p. 27). Bayler and Stoughton also argue persuasively (but worryingly for many publishers) that the "content is king" mantra we have all heard repeated so many times is not only erroneous, it is positively a barrier to establishing trust with digital consumers. They argue that "content is king" produces the effect of ignoring or even abusing the customer's time by overloading them with irrelevant content in the goal-directed environment of the Web (Bayler and Stoughton, 2002, pp. 99-122).

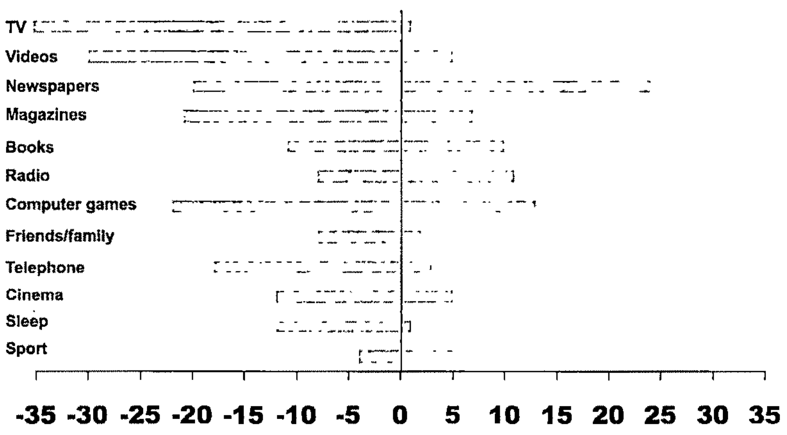
The loyalty shifts that Bayler and Stoughton identify are already being witnessed in consumer media. Figure 1 shows distinct shifts away from television and video watching, magazine reading and even sleep in those UK households where Internet access is established. The picture in the USA is not significantly different. Remember, too, that these shifts have largely taken place in a single decade, though the underlying trend in all consumer media since about 1950 has been a slow, steady adoption of electronic media at the expense of print media, particularly for news and information gathering. In the UK, one or two sub-trends, such as the spectacular success of the consumer magazine industry in the 1980s and the relative strength of regional newspaper publishing in the 1990s, have bucked the main trend. Overall, however, the move in consumer information gathering habits, especially among young people, has been away from print and into electronic, and away from one or two trusted sources to the over-sampling of multiple sources.

Some of the main changes in the pattern of consumer behaviour are being seen on the commercial side of digital delivery. They will also vote with their wallet or purse, as well as their information-gathering brain, as the astonishing growth of online air travel booking has shown, despite the effect of 9/11:

> According to Nielsen//NetRatings (NASDAQ: NTRT – news), the European airlines sector has more than doubled its online audience since last October, with 120 per cent growth in ten months ... What's interesting is that the fastest-growing sites – Lufthansa, BA and KLM – are all the sites of well-established non-budget airlines ... Consumers still want cheaper flights, as the success of travel portals shows, but they can get those flights now from a range of operators, not just "budget" airlines.
>
> This shows that the established airlines are more Web-savvy now, more competitive on price, as well as on reliability and customer care issues, enabling them to compete more effectively with the budget online airlines (Nielsen/NetRatings, 2002)[1].

The big question for the information profession is if "Today's information consumer is a 'flicker' and flicks in response to massive consumer choice" (Nicholas *et al.*, 2002), how far will this behaviour extend to organised information retrieval? We have, after all, in our lifetimes, witnessed the transformation of "the reader" into "the user" in response to the first wave of mediated online activity. How far will the explosion of totally unmediated online and related activity go? What will be the impact of the mobile device, and particularly multimedia messaging systems (MMS), broadband wireless access and the integrated PDA/

Figure 1 UK users – change in media consumption



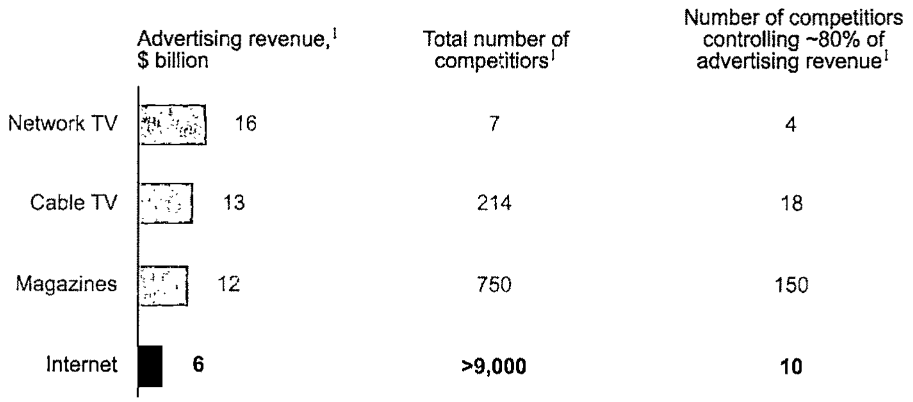
mobile? The evidence so far is that the answers are too difficult to call in these very early stages of the digital revolution, but there are early warning signs of the impact that digital can have on markets, producing difficulties for existing players.

In developed consumer digital markets such as the UK, the top ten domains include only one pre-digital media brand, BBCi, and in both the UK and the USA the top ten online brands enjoy 80 per cent of the available advertisement spend. This was one of the major aspects of the failure of many Internet content providers to make money from the digital marketplace, as is clearly illustrated by the following exhibit (Figure 2) from a recent *McKinsey Quarterly*.

Conclusions

The full power of the Web to disintermediate and to provide scale economies has yet to be seen, but it could be very significant. Fortunately, many of the scientific, technical and managerial (STM) publishers have been quicker to mount defensive strategies online than their consumer counterparts, and have faced fewer incursions from new players because of the inherent strength of their published archive. However, as McKinsey has shown, these publishers may not find that they enjoy the same margins and revenue from online subscriptions as they have from print. If the consumer information model is any

Figure 2 First exhibit from *McKinsey Quarterly*

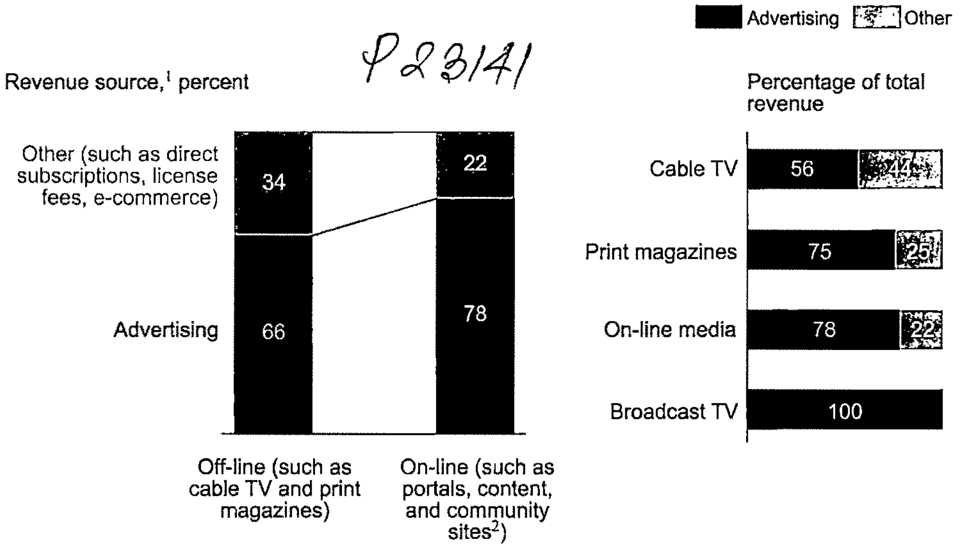


	Advertising revenue,[1] $ billion	Total number of competitors[1]	Number of competitiors controlling ~80% of advertising revenue[1]
Network TV	16	7	4
Cable TV	13	214	18
Magazines	12	750	150
Internet	**6**	**>9,000**	**10**

Note: [1]US figures (2000)

Source: Editor & Publisher: eMarketer: McCann-Erickson: National Cable and Telecommunications Association: McKinsey analysis

Figure 3 Second exhibit from *McKinsey Quarterly*



P23141

Note: [1]US figures; [2]Based on advertising and referral revenues

Source: Compustat; McKinsey analysis guide, the advertising/subscription revenue ratio is somewhat different in the online market. Another exhibit (Figure 3) from the *McKinsey Quarterly* illustrates how much more exposed Internet content providers are to support from advertising revenue (which has in any case proved, as we have seen, much more elusive than for print publications) (Bughin *et al.*, 2002).

It would be presumptuous to claim, especially at this early stage of digital adoption, that the hard lessons learned in taking consumer information products online are directly applicable to specialist publishing markets such as STM. The fact remains that huge change is on the way for information providers of all kinds, and we have hardly begun to see the effects of it yet. We cannot dismiss the early evidence of changes in revenue portfolios and particularly in the way that consumers approach information online.

Note

1 "Lufthansa tops Ryanair on the Web", http://uk.biz.yahoo.com/020930/218/darb4.html, (accessed 8 October 2002).

References

Bayler, M. and Stoughton, D. (2002), *Promiscuous Customers: Invisible Brands*, Capstone Publishing, Oxford.

Bughin, J.R., Hasker, S.J., Segel, E.S.H. and Zeisser, M.P. (2002), "What went wrong for on-line media?" *McKinsey Quarterly*, available at: www.mckinseyquarterly.com/ (accessed 9 October).

e-Mori Technology Tracker (2002), July.

Nicholas, D., Withey, R., Huntington, P. and Williams P. (2002), "The digital information consumer", *Library & Information Update*, Vol. 1 No. 1, pp. 32-44.

Nielsen/NetRatings (2002), newsletter available at: www.nielsen-netratings.com/ (accessed 8 October).

Digital information consumers, players and purchasers: information seeking behaviour in the new digital interactive environment

David Nicholas, Tom Dobrowolski, Richard Withey, Chris Russell, Paul Huntington and Peter Williams

The authors

David Nicholas, Tom Dobrowolski, Richard Withey, Chris Russell, Paul Huntington and **Peter Williams** are all at the Centre for Information Behaviour and the Evaluation of Research (ciber), Department of Information Science, City University, London, UK.
E-mail: nicky@soi.city.co.uk
URL: www-digitalhealth.soi.city.ac.uk/isrg/doh.htm

Keywords

Digital communications, Electronic commerce, End-user computing, Information services, Interaction

Abstract

Sketches the key characteristics of the newly information enfranchised general public (the digital information consumers). Portrays the digital consumer as all-conquering/powerful, short on attention, promiscuous, untrusting and – above all – interested in speed of delivery. Argues for a fundamental re-think of the concept of the information "user". The Web, search engines etc. are creating a level-playing field and a homogeneity which results in academics behaving more like the general consumer and the general consumer behaving more like an academic. Considers the overall outcomes and benefits of information acquisition.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings: New Information Perspectives
Volume 55 · Number 1/2 · 2003 · pp. 23-31
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310462689

Introduction

We were surprised at the initial hostility shown towards the first "end-user" recruits in the late 1970s/early 1980s and were always convinced that the disparaging of their search styles and information seeking behaviour was much to do with professional insecurity. However, all of this concerned bibliographic systems, largely devised for information professionals, academics and scientists. These were niche players, using niche and targeted systems. All that has now changed. Towards the end of the 1980s the number of end-users went through the roof, from hundreds to thousands and then on to millions in the 1990s and tens of millions in the new millennium. No one disparages them anymore – there are too many of them for that; they have considerable clout and we now call them consumers, as recognition of their new found (economic) powers.

It was not just the numbers of people using the systems that changed so dramatically, the types of people using the systems changed dramatically too: people without any previous experience of information systems – children, the elderly, those who had never been to university, and the unemployed. Of course, the systems themselves were changing fast. No longer OPACS to find references, but now the Web to download music or shop, or digital interactive television (DiTV) to check out on an ailment with a broadband nurse. No longer static, archival systems in public or work places, but mobile systems, real-time systems, interactive systems in the home; systems that owed more to the media world than they did to the world of information retrieval and references. Moreover, systems that were very cheap to use compared to their predecessors.

The end-user has become the information consumer, indeed, the information player. Player is a good term that recognises that today's information seeking can be interactive, recreational, social and competitive and acknowledges the characteristics of individuality and activity that define today's online engagements (Nicholas and Dobrowolski, 2000).

Given the seismic shifts chronicled above one would logically expect the new digital information consumers to act and react very differently from those landmark Dialog, Nexis and Reuters end-users. But there are not the data to tell us how differently. Information researchers still seem obsessed with students and academics – easy to research groups, but hardly unknown, representative or even strategic. Most worryingly perhaps, unrepresentative, old and dangerously obsolescent models of information consumer behaviour are being peddled around.

Aims and objectives

The aims of this paper are to provide early intelligence as to how the new digital information consumer behaves when seeking information, advice and services online, whether this is via the Web, digital interactive television or touch-screen kiosk. It also aims to show how the information fingerprints, the first footfalls of millions, of people can be charted and evaluated. We now have more accurate ways of mapping the new information landscape, which possibly brings into question the small and sketchy pictures we drew of the "old" landscape.

And it is precisely what these new information consumers are getting up to and what they may do next which concerns us most here. We have been amongst the first people to study one of the first – and much hyped – "flights" of consumers to the Web: that of newspaper readers (Nicholas *et al.*, 2000). Millions of people flocked to the newspapers we studied – *The Times*, *Sunday Times*, *The Independent* and *The Guardian*. Here we obtained our first glimpses of the "upside down" new world order of the digital consumer – all these sites were haemorrhaging money – as they are still. The digital consumer does not like paying directly for information and the advertisers that prop-up these sites are not at all convinced that consumers read the advertising on these sites because they do not stay around long enough. Despite the digital largesse of the media magnates, people still seem happy to buy hard-copy newspapers. In consequence, their hard-copy cousins have to bail them out, something that is now impossible to do given the shortfalls in advertising income resulting from the events of 11 September.

More recently (2000-2003) we have been charged by the Department of Health to evaluate the similarly much-hyped roll-out of digital health services to the nation (Nicholas *et al.*, 2002a). Health, forgive the pun, is allegedly the killer digital application and large sums of Government money are being spent to ensure that is the case – the same, of course, was said about news (Nicholas and Frossling, 1996). The lesson that the digital consumer does not like paying for their information has been learnt (but not by everybody of course – see FT.com's latest effort to get people to pay), but the question now is whether the Government has deep enough pockets to bankroll them? This time the roll-out is on a different and much more ambitious scale, the consumer is being offered three digital platforms from which to make their choice – touch-screen kiosk, Web and digital interactive television. Part of our work is to determine whether, for the consumer, this really represents choice or the digital fog descending.

And most recently (2002-2003) we have been studying the use of mobile phones by teenagers – surely the most passionate communications love affair of all (Nicholas and Chivhanga, 2002).

The digital consumer is rapidly metamorphosing into the digital purchaser. They now add a growing commercial consideration to the decision mix. Following Christmas 2001, 78 per cent of consumers stated that they would probably look to purchase "more" or "significantly more" online in Christmas 2002 (eDigitalResearch.com, 2001). In addition users' expectations for Internet purchases are rapidly changing. They expect better pricing, ease of use, secure payments as well as the complete customer service back up they would get from traditional channels. Interestingly, and perhaps more worryingly for manufacturers and High Street retailers with large marketing budgets, "brand" and "high street" presence seemed to have little relevance to the digital consumer (eDigitalResearch.com, 2002) – an important characteristic of the digital consumer we shall return to.

Methods

Plainly a few people in Clerkenwell (City University) evaluating the information seeking behaviour of millions of people on digital information platforms as diverse as DiTV, the Web, touch-screen and mobile phone require a special type of methodology, and we believe we have that. All these systems record the information activities of their users (transactions) as a kind of digital fingerprint. They do this on a real-time and continuous basis. We call them logs – they constitute the CCTV of cyberspace. Logs provide a methodological level playing field, which enables comparisons to be made between sites, services and digital platforms. They also enable us to pen information portraits of whole populations of people rather than small communities – although, of course, we can do this as well. We have logs for millions of health information consumers, in some cases for a period of as much as five years. As we write, thousands and thousands more digital fingerprints enter the database and will continue to do so for a number of years to come, so we can monitor change and obtain a video, rather than snapshot, of the rapidly unfolding digital revolution. The sheer numbers of consumers allow an accuracy of opinion and evaluation not dreamt of, utilising traditional research techniques where costs of collection are a direct (increasing) proportion to the number of users interviewed. New digital techniques of collection and analysis allow for a previously unheard of theoretical 100 per cent collection rate amongst the total user population of any particular digital service. This digital information tide places big question marks against portraits drawn on the basis of small and unrepresentative samples. In other words we might not only have been working on the wrong models, but on small and unrepresentative data sets.

The logs we work with are anonymised and generalised but nevertheless tell us much about patterns of information seeking behaviour and a certain amount about the personal characteristics of the people searching the systems – age, gender, and postcode obtained through people willingly entering this data at the touch-screen kiosk or via a questionnaire. But not so revealing as to break privacy laws. For fuller details on the process of log analysis see Nicholas *et al.* (1999).

Used together with online pop-up and traditional questionnaires and interviews the data is particularly rich and revealing. It can be triangulated to give us a real "grip" of what is going on. Indeed, the data collection rates, as well as the quality obtained from unsolicited Web based research, seems to indicate that users have a propensity to provide useful feedback of their experiences. Digital research methods allow instant and real-time feedback of opinion and habits from the digital consumer.

Digital consumer characteristics

Enormous and unprecedented numbers

If we can believe every Web site "hits" release, digital consumer traffic is only ever measured in millions. Indeed, even if these counts are inflated and misleading, their sheer numbers are probably the digital consumers' key identifying characteristic. The numbers are now so large that they have become meaningless – we expect them to be large, we get blasé. But there is a negative aspect to the impressive audience figures and their relentless growth – it puts people off analysing these large sets of data and thus they fail to obtain an understanding of the new digital information consumer. Even in the newly emerging digital health field that we have recently entered the numbers are beginning to rattle-up (Nicholas *et al.*, 2002a). The NHS Direct Online Web site attracts around 1,500 visitors a day. The 80 or so touch-screen kiosks of InTouch With Health attract going on to a 1,000 people a day; 400 people a day accessed the pioneering Living Health digital interactive television channel in the Birmingham area and 50 people send e-mail enquiries to NHS Direct Online everyday. And this is from a standing start. It is very early days indeed for digital health services. It is the reach figures that are really impressive though, especially in the health field. In the Birmingham area where a DiTV health service was rolled out recently, after six months just under 40 per cent of Telewest subscribers had availed themselves of the service. Of course, big numbers make big waves.

All-powerful

There has been a massive shift in power from information provider to information consumer. Information players have enormous power. And this is not just because of their numbers. It is also to do with the fact that they have huge choice (something we will pick-up later on) and the backing of governments everywhere. Providing power and choice to the consumer has become a political mantra.

Personal characteristics

Digital information users are no longer just academics or professionals. Nor are they just adults or young IT obsessed men. In fact our health research shows that there are quite different audiences for the various digital platforms and services (Nicholas *et al.*, 2002a). Thus DiTV users tend to be older (well over a third were aged over 55); health Web site users were typically 35-54, and kiosk users were largely young (under 35 year olds). Women were slightly more likely to use digital health services than men, except in the case of DiTV and, interestingly, a kiosk located near the pharmacy in Safeway! DiTV users were also more likely to be unemployed, a housewife/mother, or retired. To the DoH this was encouraging in that it supported the argument that DiTV throws an ICT lifeline to those who have traditionally been excluded from the digital revolution – the poor and socially excluded. And we all know about how teenagers are attracted to mobile phones.

The Internet, initially a male dominated domain, now reflects the gender balance of the general population. In addition we perhaps cannot rely on the traditional demographic profiling used to neatly predict consumer behaviour. There is a need to revisit how users view digital media and how these new user profiles react to the fast moving delivery methods activated by this media.

OPAC and commercial online researchers never had to contend with one kind of "user" found in large numbers in cyberspace – the robot or the spider, sent out, for instance, by search engines for indexing purposes. Robots were found to account for 30 per cent of users in our newspaper studies (Nicholas *et al.*, 2000). The question is do they constitute users and should they be counted with human users? Most software programs tend to exclude them, but that is too easy.

Promiscuous users – short attention spans and short visits

Today's information consumer is a "flicker" or a "bouncer". As children use the remote to channel hop, so their parents information hop or bounce their way across the digital information terrain, and especially the Web. Our studies show that one third of kiosk users never really get beyond the initial menu pages, the figure for DiTV is a quarter and for the Web, where it is much easier to bounce around because of the greater choices on offer, around 40 per cent. We call these people "bouncers". We are all bouncers. This results from a number of factors:

- having very short attention spans;
- running up continuously against home pages we do not like the look of;
- being hostage to a retrieval system (the search engine) that is constantly coming up with empty, irrelevant or uninteresting postings;
- downloading and printing of data for "use" later;
- people find surfing a stimulating leisure activity, like window-shopping (it is connectivity rather than interactivity that is sought); and
- huge choice.

Even those who penetrate the sites – rarely go beyond the home page or wander very far. They nibble rather than bite. This kind of behaviour costs the information providers and sponsors a lot of money. They would much prefer we hang around, that the sites be "sticky" and more importantly come back for more.

Promiscuous

The most important reason why people flick or bounce is because they have choice – the wealth of alternative digital sources enables them to do so. Data suggest that we visit many sites but "use" few (eDigitalResearch.com, 2002). We are "promiscuous" consumers. In addition users are more aware of their ability and come to realise that they are empowered to cross traditional boundaries, whether these be geographic (e.g. wow.com shipping CDs to UK from Hong Kong, offshore gambling) or knowledge based (health issues). In research into Web site use we have found that users visit many sites but currently purchase from few sites.

What we do not know is what arises when previously niche and specialist services, like health services, are now juxtaposed with holiday, football and retail sites/services in the digital information window that is DiTV or the Internet. Plainly there must be some kind of a knock-on or interaction, but as yet we can only guess as to what it might be.

Untrusting

The multiplicity of access points to information – TV, newspapers, consumer magazines, learned journals, radio, Internet, PDA, Online services – confuses the consumer and leads to a breakdown in trust and information dissonance (Bayler and Stoughton, 2002). In comparison with print media, all electronic media (including analogue broadcast) are difficult to navigate and reference. In essence they are two-dimensional, whereas print is three-dimensional because the shape of the whole experience can be successfully deduced from the physical form. For example, even the briefest knowledge of a print newspaper (which is not usually indexed at primary use level) leads the consumer to an understanding of what they will find and where in a relatively standard formula. Digital formats, and the Web in particular, have a tendency to break down this easy familiarity and leave the consumer floating in a sea of uncertainty. The consumer responds by demoting considerations of trust and loyalty.

Of course, there are also the "authority" problems that arise from a relatively new and fast changing environment with new players coming in all the time. Authority is plainly "up for grabs". It is difficult to determine ownership because there are so many parties associated with the production of a digital information service. Take a touch-screen health information kiosk, produced by Surgerydoor, containing some information from NHS Direct Online and located in a Safeway store. To the person shopping in the supermarket who sees the kiosk and decides to use it, whom do they attribute its qualities to: Safeway, Surgerydoor – a company of which they have probably never heard, or to the NHS, should they be alert enough to spot its logo. There is no easy answer of course, but one suspects they might say Safeway.

At one time consumers trusted in the experience of the information provider. In the flattened world of the Internet, where all things are seemingly equal, experience appears less important than ever – hence the diminishing role of information professionals in the search process.

Our research shows that where advertising is obtrusive there was a reduction in trustworthiness and that traditional quality marks – like that of the NHS – are of limited worth (Nicholas *et al.*, 2003). Half of the respondents in one study we conducted did not even notice that the material was produced by the NHS (despite the strategically placed logo) and in another study younger cable respondents were less likely to recognise the NHS as a symbol of trust than their elders.

There is a sense that consumers are more brand conscious, but less brand loyal. This applies to information just as much as whiskies. Information specialists have largely accepted that information has become a commodity (sometimes, but sometimes not, with an expressed value attached to it) but do not often accept the consequences of this.

Given all this, how will the digital consumer make "purchase" decisions in the future? This is a question that will continue to exercise the commercial mind over the coming years. We have already seen fundamental changes to purchase patterns in some market places, causing dramatic shifts in corporate thinking, e.g. books, music, low cost air travel. As the search and purchase habits of the digital consumer continue to change and evolve – questions such as brand loyalty and brand and product identification become increasingly important. For example, traditionally a consumer shopping for groceries uses a variety of complex processes in making purchase decisions. How will they make those same decisions when faced with possibly more information, more choice and a different set of purchase influences? How does a brand aware consumer find and then successfully purchase the product he or she wants to buy without being seduced by a lower cost digitally available alternative? We have already seen some traditional distribution channels forced to mount successful defences of their income streams. Free music downloads through Napster.com vs traditional music publishers being one example. How many more will follow?

Novice retrievers

The digital consumer is faced frontally with the problem of retrieval. It is an inescapable process of digital information consumption. For all but experienced researchers (a minority of users), this is the first time they have faced the dilemmas of precision versus recall, of noise, and of deciding on the validity of sources. Information providers have to be aware of this and solve these problems in the same way as, in the past, they have provided contents pages, indexes and TV guides. The role of content is becoming inescapably linked, in the user's mind, with its ease or difficulty of retrieval, and this is often something quite outside the control of the original publisher. Publishers therefore are moving beyond questions of "how accurate is this?" or "how readable?" to "how visible is it?"

The concept of an information player is a very helpful one in understanding how the general public interact with digital systems – and, also, re-visiting what we have said and learnt about them in the past. Using a sports analogy, few goals are probably scored in a textbook manner. Thus the stars of the football world, like Paulo Di Canio, are famous for their ability to do the unconventional, the unusual, the creative. In any game of football players do a lot of things that are not in the training/coaching manuals, but plainly they have received training. Similarly, a lot of information is collected by unconventional, unusual or serendipitous means. Thus, maybe, what is seen as minimalist and idiosyncratic information behaviour is not so odd, strange etc. after all – maybe it was just creative. Certainly this kind of behaviour is more in tune with the thinking of Google than Dialog.

Amongst the consumer there is almost a total delegation of trust to the search engine, which is invested in almost magical powers of retrieval. So powerful is the magic that few people even ask how the search is conducted, what is being searched (and, more importantly, what is not). Now, arguably, this would not be too serious if all people were doing was searching for references or e-shopping, but when it is your health or welfare that is a different story (and this is not fully realised).

Want it now

Total access and speed of delivery appear to be the consumers' key information needs requirements. They have certainly surpassed traditional quality concerns, which is disturbing for information professionals, who have traditionally played the role of quality guardians – and still cling on to the role with suggestions of portals and the like. Total access and speed of delivery are the perceived characteristics of Amazon.com, but not of the academic or public library. And, of course, this is why the mobile phone has proved such a spectacular success – it is an always on, real-time system. Nobody today wants to wait; nobody wants to queue – even if they could. Time plainly is a rare commodity. Connectivity is what our teenage mobile phone users tell us they yearn for. And what will surely drive the use of the mobile phone as an information retrieval medium will be the vast and ever-increasing amounts of real-time information becoming available.

Real-time information, once the exclusive and treasured domain of journalist/stockbroker, is open to all and is now what everyone wants, it is the benchmark.

Consumers converging?

Convergence is the buzz phrase, however, everything that has happened in recent years seems to suggest the very opposite is happening. DiTV is the new convergent kid on the block. DiTV, the vehicle for WebTV, is not only a brand new platform, about which very little is known, it is also a platform on which much hope is invested. There is a sense, amongst politicians certainly, that this is the platform. It has real consumer reach, genuine general public credentials and will thus be the main conduit for a whole range of e-government and e-local government services for the public. Essentially, the argument goes, everybody has a television (and soon a digital television), more than one in many cases, everybody is familiar with them, and maybe most importantly it throws an ICT lifeline to all those who have been excluded from the digital revolution to date – the poor, socially excluded, elderly etc.

However, our data tells us that it is very much digital horses for courses. Web users certainly are not convinced at all about the benefits of DiTV. Platforms are one further manifestation of choice.

Interactive consumers?

Interactivity – surely the great sell and the big disappointment? Interactivity must be the most abused, misused word in the digital world. So much so we have introduced another word, transaction, to differentiate services that offer more than the ability to interrogate a database and download a few pages of information. Transactional services are those services that involve a much closer engagement, a much greater degree of two-way interactivity. Many e-services involve nothing more than digital leaflet distribution or a mail-order facility. However, in the case of one of the digital introductions we have evaluated – the In-Vision service, a broadband on your television, in your home, nursing service – you have something that begins to meet the consumers' expectations of what interactive services are all about (Nicholas *et al.*, 2002b). Interestingly, whether it was too intrusive or just too novel, the take-up was disappointingly low (130 people used the service in six months).

In addition there are equally strong signs that the digital consumer will research and take commercial decisions online when presented with a viable alternative and less expensive method of decision making and subsequent acquisition.

Unpredictability

If nothing else, the digital consumer is unpredictable. Of course this unpredictability partially stems from the fact that the digital information consumer is such a recent and fast emerging phenomenon.

When a digital service is rolled out the unexpected inevitably happens, take:

- *Touch-screen information kiosks.* Health touch-screen information kiosks, designed with the elderly in mind, turned out to be most popular with the under 15s.
- *Mobile phones.* Few people anticipated the phenomenal rise of the mobile phone. And no one at all surely anticipated that it would be children who would fuel much of this growth. After all, the cellular phone was originally conceived as a communications technology for people away from the office – farmers and sales executives. Then there is the enormous popularity of text messaging amongst children, on a medium that was designed to trumpet the well-known attractions of oral communication.
- *Digital libraries.* The Big Deal was a solution to the "serials crisis" which was developed during 1997. The basic deal is that the publisher continues to receive the same amount of money as they received from print subscriptions from all the libraries in a consortium. For a small surcharge, all the libraries in the consortium receive electronic access to all the journals published by a particular company. The advantages of the deal were seen as: increasing content delivered per dollar spent; stabilising economic relationships; maximising content delivery per publisher; maximising use via electronic access. All these things were achieved but what was not anticipated was that journals previously not subscribed to in print were used more than those previously subscribed to – questioning as a result intermediary involvement in the selection process. Of course, the unbundling of articles from their journals that occurs in the digital environment could well provide the explanation (Nicholas *et al.*, 2003).
- *E-commerce.* New brands and distribution methods can earn the trust of consumers and become leaders in their field in a very short time span, challenging traditional methods of distribution (e.g. amazon. com, easyJet.com).

Outcomes and benefits

What happens when the controls are taken off and people who have been starved of information, or told only what information is considered good for them, wake up to the fact that there has been a revolution and now information is everywhere and easily accessed? Flood the area with information – pipe it into people's homes, surgeries, railway stations and libraries and something really big is likely to happen. We have the makings of the biggest information bang ever heard. The first rumblings can already be heard – after all there are millions of consumers on the information road now.

Performance measurements have been important to information and computer professionals, but usually only in terms of search engine efficiency and the relevance judgements of the users – before they actually go away and digest and make something of the information. But of course the real concern now is that, when life-critical services, like health, are moving over to the digital environment what do consumers do with the information and how does it impact on other services and aspects of their lives. The fact that someone used a Web site and maybe consumed the information or bought the product is interesting, but not half as interesting as what it did for them and how it affected the other things they do.

There is more than a little suspicion that the Government believes that the provision of digital information direct to the consumer will go some way to reducing the pressures on the health service – a case, maybe, of patient heal yourself. There is indeed some evidence to suggest this is happening. One third of Living

Health television channel viewers said that the information found either helped or helped a lot in improving their condition. This constitutes an important use of a health information service. The younger the respondent the more likely they were to report substituting information they had found for a visit to the doctor. There were signs too of joined-up health information acquisition. Well over half DiTV users queried the service for information about their consultation with the doctor either before, after or before and after their consultation.

In commercial markets we also see changing purchase patterns as information becomes more readily available and consumers understand how to find it. Consumers have steadily increasing access to more information to pricing, availability and details of products and services. Despite the effect of 11 September the low cost airlines report increasing volumes of travellers (easyJet up 36 per cent half year on corresponding half year) with bookings over the Internet taking an increasing proportion of bookings (easyJet, 2002).

Reflections and conclusions

It is a story of big change, all change and rapid change. There are lessons for us all:

- Most of all that the behaviour of the digital consumer needs to be tracked and evaluated as a matter of course. We have shown how spectacular and unexpected it can be. As more services go digital we need to fill the intelligence vacuum quickly.
- Information vendors and providers (libraries included) will have to engage in the same processes as all other providers of goods and services, and put customer relationship management (CRM) at the centre of the information experience rather than at its periphery (or commonly, nowhere at all). As Rakesh Sood (2002) pointed out in an article published in TheStreet.com:

> What does the emerging promiscuous era hold for vendors? Locking in customers becomes more difficult. Vendors will need to further differentiate their offerings, re-examine their value proposition and stay on their toes while executing at a higher level on a continuous basis. While periods of temporary dislocation are inevitable, the customer is the ultimate beneficiary. Is it likely that, before too long, the adage "the customer is king" becomes transformed into "the promiscuous customer is king"?

- Not only do we need to challenge our assumptions about the information consumer, but we also need to ask where digital information provision, and especially the Web, is taking the consumer. Consumers are being fast-forwarded to a data-driven world, in which the only thing that changes is the amount of information made available to them and the platforms on which this information is disseminated. Loads of links, endless links, thousands of postings characterise the journey – an endless information journey with seemingly no destination. Consumers are unlikely to even remember where they went on their journey; they will retain little of the information, or how they can return to it. There is no sense of knowledge building. People are gradually being divorced from the roots of communication/knowledge. The problem is that the (false) sense of engagement and action associated with online searching/surfing makes the consumer feel that something is being achieved, but this is not always the case.
- The other worrying phenomenon, and it is linked to the above bullet, is that it is not the information or content providers that are making anything out of digital information provision but the telecoms companies. Telecoms companies are technologically driven and think about nothing more than backbones (and profits). If things continue like this for long there could soon be no content providers worth the name. Could you imagine a world in which supermarkets gave their produce away for free and the councils charged you for access to the roads that led to the supermarkets? No, well that is the situation we have in cyberspace.

References

Bayler, M. and Stoughton, D. (2002), *Promiscuous Customers: Invisible Brands*, Capstone, Oxford.

easyJet (2002), "easyJet reports 91 per cent of bookings taken online", *easyJet Interim Report*, 31 March.

eDigitalResearch.com (2001), *Has Commerce Come of Age?*, January, available at: www.emysteryshopper.com (accessed 8 January).

eDigitalResearch.com (2002), *Vital Statistics*, April, available at: www/mysteryshopper.com (accessed April).

Nicholas, D. and Chivhanga, M. (2002), "The communications love-affair: children and the mobile phone", *Library Association Record*, Vol. 104 No. 2, February, pp. 90-5.

Nicholas, D. and Dobrowolski, T. (2000), "Re-branding and re-discovering the digital information user", *Libri*, Vol. 50 No. 3, pp. 157-62.

Nicholas, D. and Frossling, I. (1996), "The information handler in the digital age", *Managing Information*, Vol. 3 No. 7/8, pp. 31-4.

Nicholas, D., Huntington, P. and Watkinson, A. (2003), "Digital journals, Big Deals and online searching behaviour: a pilot study", *Aslib Proceedings*, Vol. 55 No. 1/2, pp. 84-109.

Nicholas, D., Huntington, P., Lievesley, N. and Wasti, A. (2000), "Evaluating consumer Web site logs: case study – *The Times/Sunday Times* Web site", *Journal of Information Science*, Vol. 26 No. 6, pp. 399-411.

Nicholas, D., Huntington, P., Williams, P. and Gunter, B. (2002a), *First Steps Towards Providing the Nation with Health care Advice and Information via Their Television Sets: An Evaluation of Pilot Projects Exploring the Health Applications of Digital Interactive Television. Report to the Department of Health*, City University, London.

Nicholas, D., Williams, P., Huntington, P. and Gunter, B. (2002b), "Broadband nursing: how have the public reacted to being able to talk to an on-screen nurse for advice?", *Library and Information Update the magazine of the Chartered Institute of Library and Information Professionals Magazine*, Vol. 1 No. 4, pp. 50-1.

Nicholas, D., Huntington, P., Williams, P., Lievesley, N. and Withey, R. (1999), "Developing and testing methods to determine the use of Web sites: case study newspapers", *Aslib Proceedings*, Vol. 51 No. 5, pp. 144-54.

Sood, R. (2002), "Making promiscuity pay", available at: www.thestreet.com/pf/comment/connectingdots/1014698.html (accessed 11 February 2002).

Further reading

Nicholas, D., Gunter, B., Williams, P. and Huntington, P. (2002), "DiTV – a healthy future", *usableiTV*, Vol. 2, pp. 13-17.

Nicholas, D., Huntington, P., Williams, P. and Gunter, B. (2003), "Digital consumer perceptions of the authority of health information: case study digital interactive television and the Internet", *Health Information and Libraries Journal*, Spring (in press).

Beyond outputs: new measures of biomedical research impact

Grant Lewison

The author

Grant Lewison is a Professor at the Centre for Information Behaviour and the Evaluation of Research (ciber), Department of Information Science, City University, London, UK. E-mail: g.lewison@soi.city.ac.uk

Keywords

Information science, Mass media, Research, International standards

Abstract

Biomedical research evaluation has traditionally been based on analysis of outputs and their citations by other papers. However we should try to map the routes by which research actually improves patient care and reduces illness, and develop indicators for them. We must allow for the lengthy time-scales involved and the importance of researchers being physically close to healthcare professionals, whose practice can be improved through international and governmental regulations and through approved guidelines. Each of these will depend on a body of research evidence. We must also evaluate the effects of research on policy makers and the public, who often learn about it through the World Wide Web and through the mass media, particularly newspapers. The latter provide a major bibliometric resource but one that needs to be tapped in individual countries using common standards in order to provide internationally-comparable indicators.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings: New Information Perspectives
Volume 55 · Number 1/2 · 2003 · pp. 32-42
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310462698

Introduction

The evaluation of research is one of the tasks to which information scientists have been able to contribute through their analysis of databases of publications. They have thus been able to help shape the research agenda, especially in biomedicine where articles in the serial literature form the standard currency of research activity (Lee, 1998; *Research Fortnight*, 2000). There are several databases that list these articles, such as EMBASE, MedLine and the Science Citation Index (SCI). They can be interrogated in various ways in order to identify the outputs of selected countries or research groups, or papers in particular subject areas, or both, and then to compare these sets of papers on different criteria. Typically, numbers of papers are counted and compared with the inputs to the research (money or people) (Leta *et al.*, 1998; Noyons *et al.*, 1998). Measures of impact have also been developed, mostly dependent on the frequency with which the papers are referenced or cited (Garfield and Welljams-Dorof, 1992; Bourke and Butler, 1996; Kostoff, 1998; So, 1998; Meho and Sonnenwald, 2000) by other researchers. These indicators can be determined from the SCI, or from journal-based measures such as the mean citation counts for their papers (Balaban, 1996; Lewison, 1998) or their subjective esteem by researchers (Lewison, 2002a). In recent years, citations by patents have also been analysed to provide an indicator of technological utility (Narin, 1994; Narin and Olivastro, 1998), but this is less useful as very few papers, typically only 2 per cent in biomedicine, are ever cited by a patent.

However these measures do not go far to show whether the research is actually having an impact on the real world outside the

---

The author is most grateful to Potenza Atiogbe for the work she did on her MSc dissertation and for permission to quote her results. The analysis of NICE clinical guidelines was carried out by Magdalena Vinter and Catherine McKearney as part of City University's updating of Mapping the Landscape on behalf of the Wellcome Trust. The recording of newspaper articles that cited biomedical research was greatly facilitated by the Wellcome Trust's daily compendium, "What the papers say . . ." compiled by Elizabeth Graham and her staff at the Trust's Information Centre and distributed to staff members, of whom the author is one.

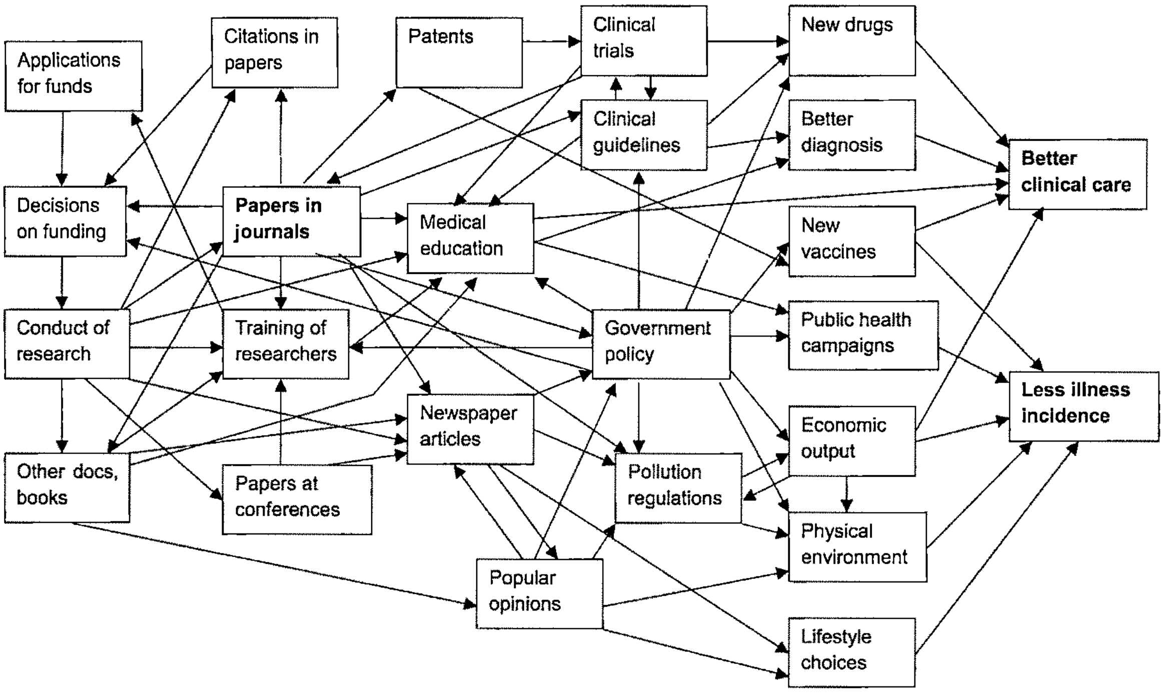
laboratory. We want to know if human health has actually benefited from the research, either through better patient care or from less illness. Figure 1 shows some of the numerous and rather tortuous links by which biomedical research may have such an effect. It makes two main points: first, the links involve several steps and much time and, second, government policy is clearly critical to the whole picture. This is especially so in a country such as the UK with a state-funded National Health Service (NHS) and a tendency to bring in lots of regulations influencing people's lifestyle choices. Examples are the requirements to wear seat belts in cars and helmets on motorbikes, and bans on smoking in public buildings and on public transport[1].

This paper seeks to describe some new ways in which parts of this diagram can be mapped. They will be accompanied by examples, which give an idea of the main parameters that can be analysed, and some initial results. These are not definitive, but they do suggest that conventional, citation-based, measures of research utility may be very partial and in need of supplementation with quite different indicators if the true impact of biomedical research is to be appreciated. In particular, it appears that although citations may be appropriate for basic research, they can under-evaluate clinical work. Moreover, the routes by which research influences health are primarily national ones, and therefore it is necessary for bibliometricians (as information scientists working in this field call themselves) to develop their own national indicators rather than rely on international citation data.

If one is analysing the impact of research in a small country, one should perhaps start by asking the question, why should that country carry out biomedical research anyway? After all, it is very unlikely that key discoveries will be made there compared with the larger and better-funded labs in the USA. Small countries nevertheless do carry out their own biomedical research for a number of good reasons, amongst which we can list:

- to improve the training of doctors and people working in the professions allied to medicine (e.g. dieticians, nurses, physiotherapists, speech and language therapists);
- to absorb research conducted elsewhere and be able to apply it quickly in the country;
- to foster an intellectually well-developed healthcare culture that will attract able physicians and surgeons who can provide a high standard of patient care; and
- to research diseases of local and national significance but which may be of marginal importance internationally.

Figure 1 The links between research and better health



It is not surprising, therefore, that many countries will want to evaluate their research by reference to national indicators of effectiveness rather than the international standard of citations from scientific papers.

In this paper we consider the development of three sets of indicators, which can be of national or international origin, and can reveal some ways in which biomedical research can affect health:

- through standards limiting human exposure to pollutants;
- through the development of clinical guidelines for patient treatment; and
- through the reporting of biomedical research in the mass media, specifically in newspapers.

The effects of pollution on human health have been well-established: the main effect in developed countries is now from air pollution (Hahn, 1996; Konisky, 1999), particularly from small particles emitted from vehicles, given that smoke and SO_2 from most stationary sources have been drastically reduced over the last half-century. However there is popular concern over the safety of food (Birchard, 1999; Gregoriadis, 1999; Boseley, 1999) and the dangers of pesticide residues have been the subject of books and other reports (Colborn *et al.*, 1996; O'Brien, 1996; Kondro, 2000). Their true overall contribution to ill-health seems likely to be almost vanishingly small (Doll and Peto, 1981; Gough, 1989; McGinnis and Foege, 1993), but in the public's mind they are things that ought to be removed. There are, indeed, international standards for the levels of permitted residues of various pesticides in different foods, and they are developed by a United Nations body, the Codex Alimentarius Commission (CAC), which was formed jointly by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) in 1962. We have looked at a sample of the evaluations produced by the CAC and the references in them in order to see which countries' research is used to develop these standards, how long it takes for papers to be cited and what type of research is used.

The second area of study is clinical guidelines. In the UK, there are many different sources of guidelines but they do not all enjoy widespread dissemination or command the same degree of respect. Until fairly recently, guidelines assessed by the NHS Appraisal Centre for Clinical Guidelines at St George's Hospital Medical School had a superior status. In a study of the references listed in the SCI in a sample of 15 of them Grant and his colleagues (Grant *et al.*, 2000) found that:

- British research was cited about 2.5 times as much as expected from its presence in the world biomedical literature (10 per cent);
- most of the references were to papers in journals classed as "clinical" rather than basic;
- the median time lag between publication of papers and citation in guidelines was eight years.

Since then, the National Institute for Clinical Excellence (NICE) has started developing guidelines for the NHS and, to date, 47 guidelines, supported by detailed Technology Assessments, have been published. The references in these documents, many of which deal with the efficacy of pharmaceutical drugs for particular disorders and diseases, have been analysed in order to up-date Grant's study and reveal which papers have had an influence on patient treatment in this way.

The third area of study is the citation of biomedical research news in newspapers. Although it can be argued that television may have more influence, it is much harder to analyse the references to biomedicine in that medium because of the difficulties in monitoring them and because the references will vary so much in extent and type. Newspapers have a wide readership, from politicians and senior officials to healthcare administrators, doctors, researchers and the general public, many of whom are becoming very health-conscious. Results are presented from a two-month sample of UK national newspapers, more to show the types of questions that can be asked and answered than to give definitive statistics. There is also discussion on how such a project could be internationalised.

Pollution control: pesticide residues in food

This project was carried out by Potenza Atiogbe as part of her work for a MSc degree at City University (Atiogbe, 2001). It began with the identification of some 32 individual pesticides, which had been subject to toxicological evaluation, some more than once. Table I shows the ones most subject to evaluation.

The 74 individual evaluations were written from 1976 to 1995 and covered several aspects of pesticide residues in food:

- technical problems in the measurement of (often) small concentrations of pesticides;
- dietary surveys to establish how much of the given food is eaten both routinely and by some special groups;
- toxicology studies to show whether the ingestion of given amounts of pesticide is likely to be harmful.

The CAC evaluations and the references in them were taken from the Web, and the first 1,000 individual references were copied and pasted into an Excel spreadsheet so that they could be looked up in London libraries. Some 740 of them were found and their addresses and funding details were noted, and entered back on to the spreadsheet for analysis. In particular, the differences in time between the date of publication of the papers and their citation in a pesticide evaluation were noted.

It was necessary to have a comparator file so that the literature cited by the guidelines could be seen in context. This was developed by the creation of a pesticide "filter" called PESTIWLD. This took papers from the SCI from 1991-1998 if they were in one of three specialist journals (*J. Pesticide Sci.*, *Pesticide Sci.* and *Pesticide Biochem. Physiol.*) or had the name of a pesticide in their titles, and also had a title word indicating that the effects of the pesticides on humans or the environment were being studied. For example, assess* or carcinogen* or degrad* or expos* or pollut*, or cat or dog or mouse or rat, the most commonly used animals for testing, would indicate a paper testing the safety of a pesticide. This file contained 5,461 papers. The references from the pesticide toxicology papers published in 1998 were downloaded to form a fourth file with 19,034 papers and their dates were analysed so that the distribution of times between publication of a paper in a journal and its citation by another journal paper could be determined. Data were also obtained on the research levels (from clinical or applied to basic) and the potential impact category of the journals in which the CAC evaluation references and the pesticide toxicology papers were published.

Table I Pesticides frequently evaluated for human effects, 1975-1995, by the Codex Alimentarius Commission

Pesticide	
Captan	5
Carbendazim	4
Fenitrothion	4
Imazalil	4
Methamidophos	4
Acephate	3
Carbaryl	3
Chlordane	3
Chlorothalonil	3
Diphenylamine	3
Fenamiphos	3
Fenthion	3
Lindane	3
Malathion	3
Paraquat	3
Chlordimeform	2
Dichlorvos	2
Dimethoate	2

Figure 2 shows the comparison between the time differences between publication and citation for these two groups of papers. It is evident that it takes much longer for papers to be cited on CAC evaluations than on scientific papers; this result can be compared with that found (Grant *et al.*, 2000) for clinical guidelines. Our conclusion is that it may take more than five years for the true utility of research papers to pesticide regulation to become apparent, even though it is possible to gain a good idea of their likely citation performance at the end of this time.

Figure 3 shows the frequency with which papers from each of 20 countries are represented, both in the CAC evaluation citations and in the pesticide toxicology papers. It enables us to see whether the former reflects the relative contributions to the literature of these countries, as represented by the latter. It appears that the USA is over-represented and several countries, notably ES = Spain and to a lesser extent FR = France and JP = Japan, are under-represented. This reflects their much smaller relative contribution to pesticide toxicity literature in the 1970s and 1980s, from which most of the CAC references stemmed (60 per cent were from 1979 and earlier). For example, the percentage contributions of these three countries to the pesticide toxicity literature in 1981-1984 were

Figure 2 Comparison of the ages of references from CAC evaluations (CAC REFS) and those from a sample of pesticide toxicology papers in the SCI (PESTIWLD)

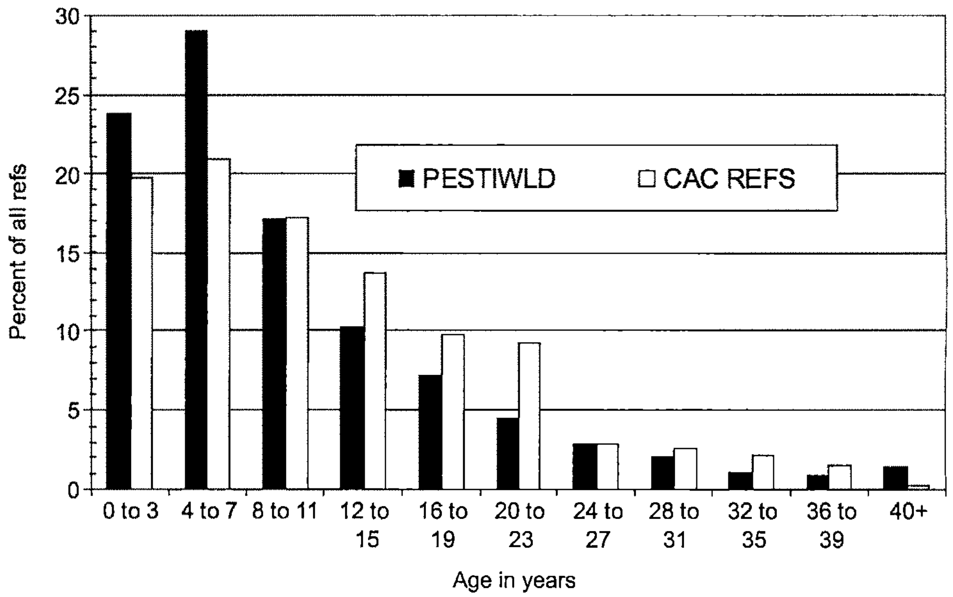
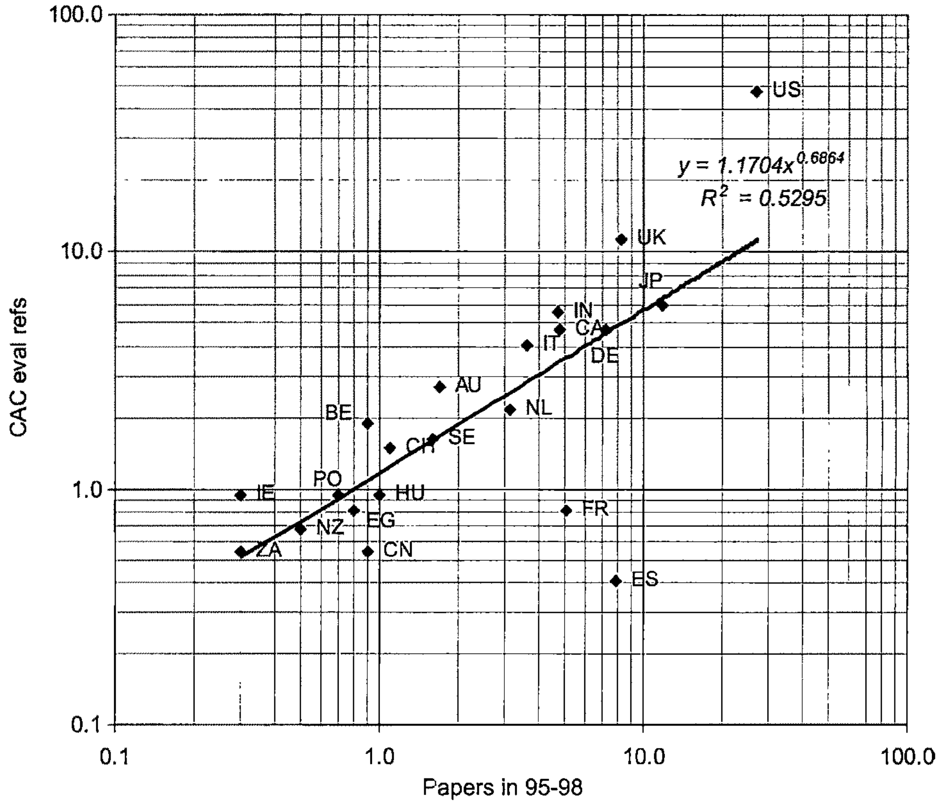


Figure 3 Comparison of the percentage frequency with which papers from various countries are cited on CAC pesticide evaluations ($n = 740$) and in pesticide toxicity papers in the SCI for 1995-1998. Log scales for both parameters



respectively only 1.0 per cent, 3.1 per cent and 10.1 per cent, compared with 7.9 per cent, 5.1 per cent and 11.7 per cent in 1995-1998. The under-representation of Japan may also be due to language: 23 per cent of Japanese papers in 1981-1982 were in Japanese (in *J. Pesticide Sci.*) and the proportion was probably higher in the 1970s. However it is remarkable how fairly most other countries, including some developing ones (CN = China, EG = Egypt, IN = India) are represented in the CAC evaluation references. This suggests that science in these countries is by no means ignored in the international decision-making process for pollution recommendations.

An analysis of the CAC evaluation references and the comparator pesticide toxicity papers by research level and by potential impact category is shown in Table II. Both sets are relatively basic, the CAC evaluation references slightly more so (the difference is statistically significant at $p \sim 0.002$ per cent). Rather few of either set are in journals of high citation impact (the norm in biomedicine is 10 per cent in PIC4, 20 per cent in PIC3, 30 per cent in PIC2 and 40 per cent in PIC1 journals). However the CAC references are in higher impact journals than the pesticide toxicity papers, indicating that, within the subject area, the evaluations are based on science of above-average citation impact ($p < 0.001$ per cent).

Clinical guidelines: technical assessments from the National Institute for Clinical Excellence (NICE)

NICE is a body set up and funded by the NHS in England and Wales. (There is a separate (and older) body for Scotland, the Scottish Intercollegiate Guidelines Network (SIGN), formed in 1993 and supported by the Scottish Executive Health Department which has published 62 guidelines covering a wide variety of subjects.) Since the spring of 2000, NICE has published 47 guidelines to clinical practice, of which the large majority (33) concern the use of novel drugs. Some of these have been contentious and have been disputed by the companies involved or by patient groups (*Lancet*, 1999; Kmietowicz, 2000). The guidelines are accompanied by leaflets for patients and depend on Technology Assessments (TAs) commissioned from specialist units in UK universities, notably York, Birmingham and Sheffield. TAS[2] contain an average of 118 references of which 67 are papers in journals covered in the SCI or SSCI, but only 49 of these are classified as articles, notes or reviews. Those published in 1980 and later have been identified, and their bibliographic details downloaded and analysed.

Figure 4 shows their distribution in terms of dates of publication, relative to the dates of the TAs. It also shows the distribution of dates of papers referenced in a sample of UK biomedical papers from 2001 (n =1,142; 35,484 journal citations) and those cited in the St George's guidelines (Grant *et al.*, 2000). It is immediately apparent that the TA references (NICE) are much more recent than both the other sets. Their median age is only 3.3 years compared with 5.2 years for the SCI citations and 7.5 years for the ones from the St George's guidelines.

Figure 5 shows their nationality, compared with the countries' presence in world biomedical literature from 1995-2000, when most of the TA references were published. As was found earlier (Grant *et al.*, 2000), the UK is over-represented by a factor of 2.2, but several other European countries are also over-represented, notably Sweden (× 2.2), Belgium, Denmark and The Netherlands (× 1.8), Switzerland (× 1.4) and Austria and Finland (× 1.3). Canada is over-cited by × 1.9 and the USA by × 1.2. The "losers" are Japan, with only 11 per cent of the expected references, followed by India (13 per cent), Brazil and Russia (24 per cent).

The distributions of these references by the research level and potential impact category of the journals in which they are published are shown in Table III and compared with a large sample of biomedical papers in the SCI for 1997. The distributions are clearly very different. As was found earlier (Grant *et al.*, 2000), the papers are largely clinical, almost 89 per cent being in the "clinical observation" (RL = 1) or "clinical mix" (RL = 2) categories compared with under 40 per cent for the SCI

Table II Comparison of distributions of references on CAC evaluations (n = 1,000) and of pesticide toxicology papers in the SCI (n = 5,461) by research level (RL, 1 = applied, 4 = basic) and by potential impact category of journals (PIC, 1 = low, 4 = high)

	RL = 1	RL = 2	RL = 3	RL = 4	PIC = 1	PIC = 2	PIC = 3	PIC = 4
CAC references	3.2	25.8	45.1	25.8	66.5	25.0	4.8	3.7
Pesticide toxicology papers	1.9	26.8	50.8	20.4	74.6	16.7	7.5	1.2

Figure 4 Delays between publication of biomedical papers and their citation on 46 health technology assessments for the National Institute of Clinical Excellence (NICE), by UK biomedical papers in the Science Citation Index (SCI) and on a sample of 15 clinical guidelines from St George's Hospital analysed by Grant *et al.* (2000)

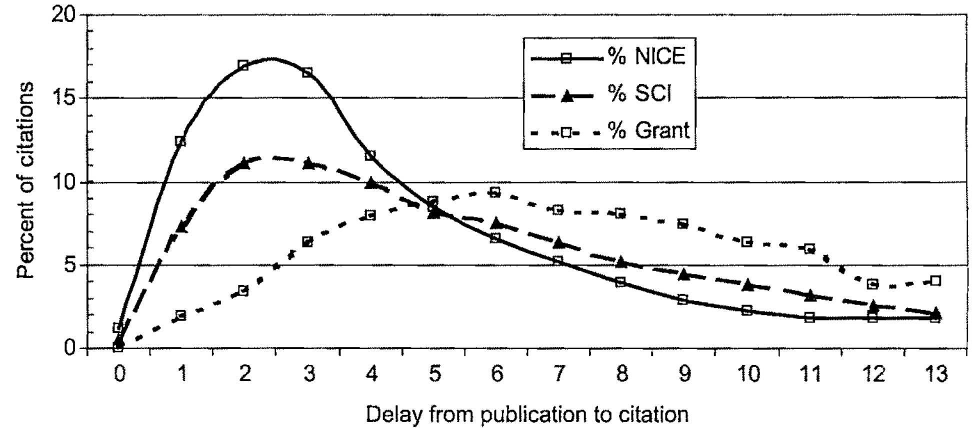


Figure 5 Relative presence of 20 leading countries in the addresses of papers cited by 46 health technology assessments for the National Institute of Clinical Excellence (NICE) and on the world biomedical literature in the Science Citation Index (SCI); integrer counts

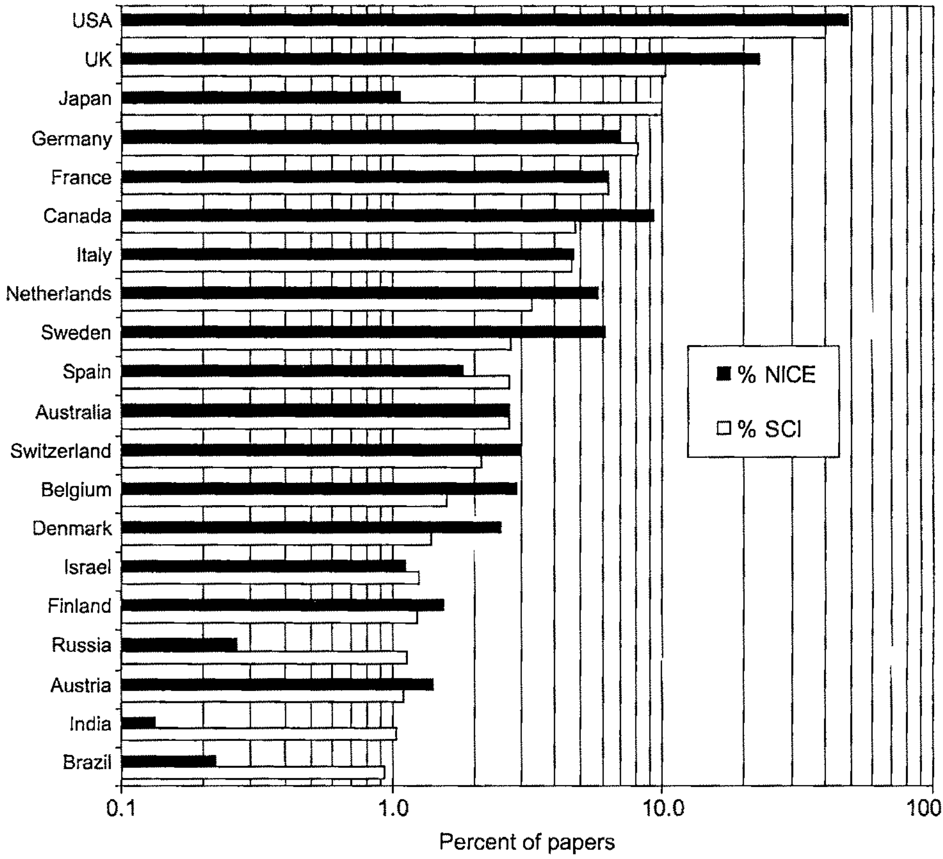


Table III Distributions of references on NICE technology assessments (n = 1,711) and of a large sample of world biomedical papers in the SCI (n = 59,731) by research level (RL, 1 = applied, 4 = basic) and by potential impact category of journals (PIC, 1 = low, 4 = high)

	RL = 1	RL = 2	RL = 3	RL = 4	PIC = 1	PIC = 2	PIC = 3	PIC = 4
NICE technology assessments	35.8	53.1	9.9	0.5	24.6	29.1	25.2	22.3
World biomedical papers in SCI	14.7	24.8	27.6	32.9	32.7	30.8	21.0	15.5

papers, and there are hardly any papers classified as basic research (RL = 4). Despite this, the papers cited by the NICE TAs are published in journals of high impact, with 48 per cent in journals of the top two categories compared with 36 per cent for the SCI papers, the differences being highly statistically significant.

Public perceptions of biomedical research advances

In developed countries, there are many potential sources of information for the public on health. In recent years, the Web has become widely available to the public and has been influential. It can be used by people suffering from rare diseases, and their caregivers, to obtain information and emotional support from fellow sufferers. One consequence is that patients are sometimes better informed than their doctors and may press them to provide forms of treatment that are newly available. They may indeed take matters into their own hands and order prescription "ethical" pharmaceuticals without the detailed examination, and possibly counselling, that should take place. They may also purchase genetic tests, sometimes ones that are actively promoted by an interested party, which may seek to spread anxiety among people in the interest of sales[3]. But the Web is not all bad: it may enable some patients, particularly men, to obtain useful information without the embarrassment that could attend a visit to their doctor.

Radio and television have been traditional sources of health information for many people. In the UK, the radio serial, *Mrs Dale's Diary* was promoted by the Ministry of Health so that useful advice could be disseminated almost subliminally through the anodyne musings of the wife of a general practitioner. Currently, television dramas about hospitals, such as *ER*, *Casualty* and *Holby City*, bring high-technology treatments to a wide audience but may give the impression that they save more lives than the less glamorous work of public health and preventive medicine. Science programmes such as *Horizon* and *Equinox* can explore issues in depth, but the effects may be negated by dramas, which give the appearance of veracity while actually being based on somewhat dubious science. A recent example is the BBC play, *Fields of Gold*, about genetically modified crops. There are also news reports on medical research, similar in tone to those appearing in newspapers. In fact, a survey by the British Broadcasting Corporation (BBC) found that science was more popular with viewers than sport, foreign affairs, the Royal family and the arts (Patel, 1994). All these reports contribute to the public perception of biomedical research but they are extremely hard to codify and quantify.

Newspapers have the great advantage of being a permanent record. Articles in them can be treated almost like scientific papers. They can be examined at leisure and have properties that can be readily codified in a database such as: newspaper title, publication date, page number, length (column-cm), journalist name(s), article title, sub-fields covered, and the details of the cited research.

The results listed below are taken from a pilot study covering two months in the summer of 2001 which have been given in detail elsewhere (Lewison, 2002b). The main findings were as follows:

- In 20 UK national papers, there were a total of nearly 200 citations per month. *The Daily Mail* and *The Daily Telegraph* provided the strongest coverage.
- Most articles were between 30 and 60 column-cm and had named journalists as authors. There were 110 different writers indicating that most papers used correspondents from several different areas (e.g. science, technology, medicine, social affairs) for their stories.
- The subjects most frequently occurring (10 per cent or more) were dietetics, cancer, neuroscience, epidemiology, genetics and obstetrics. Cardiology and mental health were seldom cited (only 6 per cent of citations).
- UK research was over-cited by a factor of about four to one; that from the USA in line with its presence in the literature (36 per cent), and that from continental Europe was under-cited.
- The general tone was optimistic, featuring new drugs and treatments, rather than scary. Women and babies were preferred as subjects to men and the elderly. Experiments involving animals were reported neutrally but with an implicit sense of approval.
- Most of the research was reported in papers in journals, notably the weeklies

such as the *BMJ*, *Lancet*, *Nature* and *Science*. *New Scientist* was frequently quoted although it is mainly a secondary source.
- The research cited is mainly clinical, although some basic research is reported, even in the tabloids.
- Nearly all the papers cited were current, although a few review articles also mentioned research published during the previous few years.

The importance of such studies is that newspaper articles are often influential in terms of public opinion and hence in policy formation, even if they are misleading or wrong. For example, a campaign against "Frankenfoods" (sic; genetically modified (GM) foods) by some newspapers (*Economist*, 1999), notably the *Daily Mail*, has had a major influence on the public in Britain. People have reacted with some anger to attempts to carry out field trials on crops planted with GM seeds, and this has also occurred elsewhere (Normile, 2000; Vidal, 2001). In the medical field, the current anxiety about the triple vaccine against measles, mumps and rubella (MMR) has been greatly stimulated by the assiduous reporting of papers that purport to show a link with autism, or are so described as doing (Anderson, 1999). This has led to a low take-up of vaccination, and in turn to a potentially serious public health problem (Laurance, 2002; Spooner, 2002).

There are several areas of medical research of potential concern to the public, which might be vulnerable to unsympathetic reporting. The first is the use of substantial amounts of public money and of the heavy reliance of medical research on charitable funds, from both collecting charities and foundations, whose tax-exempt status cannot be taken for granted. The second issue concerns the ethics of some research, particularly if it involves stem cells from foetuses (*Chemistry & Industry*, 2001; Finkel *et al.*, 2001), the use of organs from cadavers (Burton and Wells, 2001), or biological samples provided by patients whose consent may not have been fully informed (Loff, 2000). In each of these, there are vocal groups who have opposed the research because of the source of the materials. At present, the researchers seem to be winning the battle on the first and third of these but may be losing on the second because of what happened at Alder Hey hospital in Liverpool (*Research Fortnight*, 2002).

A third issue concerns animal experimentation. The violence with which Huntingdon Life Sciences plc, its employees and shareholders, have been attacked (Braid, 2000) and the difficulty of building a neuroscience research facility in Cambridge that would use primates (*Times*, 2001) indicate that this is a potentially difficult issue. It is one that the medical researchers might lose if the journalists were to adopt a different tone in their reporting of medical research.

But research has become increasingly international, with many papers being co-authored internationally, and frequent overseas travel by scientists to work in each others' labs. There is also concern that research teams may re-locate to countries with a more friendly regulatory environment or local public (Lehrman, 1995; Firn, 2000; Dyer, 2002). So we need to monitor how the press reports biomedical research in many countries, not just to see if the tone is sympathetic, but also to see how wide the readership is for news of important research developments. This will inevitably involve an international project with newspapers in many countries being scanned and their relevant articles coded and entered to a database using a uniform protocol. Fortunately the size of the project is not so intimidating that it could not be tackled with relatively modest resources. It would probably be about a hundred times the size of a system designed for the UK, and might have to record about 250,000 citations per year, far fewer than are processed for the SCI. Many of the cited papers would be the same, i.e. papers would receive citations in the press of several countries, so it would be more efficient if the look-up were done centrally. The database would also be held centrally and the details of the citing articles would be entered over the Web by recorders using a standard interface and a thesaurus of subjects. They would in turn be able to access the database in order to carry out studies for groups in their own country or for academic research purposes.

Conclusions

Traditional bibliometrics has yielded indicators of the impact of biomedical research, but these have been relevant to only a small part of the complex pattern of routes by which it will influence health. Moreover, they tend to give greater credit to basic and laboratory studies than to patient treatment and other clinical work. Other indicators, based on "downstream" effects of the research, seem to indicate that clinical work may have rather more influence than basic research, as would be expected. However there can be much longer periods of time needed for the work to have a perceptible effect, eight years or so being the median time between publication and citation on pollution and some clinical guidelines. The current NICE guidelines, however, rely on much more recent work. The reporting of research in newspapers is extremely quick and this dissemination route will be of increasing importance in future, partly because of this very speed. However newspaper coverage will inevitably be selective and sometimes misleading or even tendentious, which could have unfortunate consequences for the research process.

The other main theme of this paper has been that research impacts may well be national rather than international, that they will need national indicators to capture them and that such indicators will need to be developed, preferably on a routine basis. The relative over-reporting of national biomedical research in the UK by its clinical guidelines (Grant *et al.*, 2000 and the present work) and its newspapers (Lewison, 2002b) is probably found in other countries. This finding shows the importance of a national science base, so that there can be a critical judgement brought to bear on science carried out abroad and the benefits absorbed nationally. The small study on pesticide toxicology also suggests that a national science base is important to reinforce a country's voice in international discussions on the health effects of environmental pollutants.

Notes

1 On London buses, the penalty for fare evasion is only £5, but for smoking it can be £1,000.

2 One TA covers two different guidelines (Nos 3 and 6) so there are only 46.

3 An example is haemochromatosis, with dire warnings to 33 million Americans "at particular risk for carrying the gene mutations for this potentially fatal disease" from the American Haemochromatosis Society.

References

Anderson, P. (1999), "Another media scare about MMR vaccine hits Britain", *BMJ*, Vol. 318, 12 June, p. 1578.

Atiogbe, P. (2001), "Bibliometric analysis of the international Codex Alimentarius food pesticide standards", MSc dissertation, Department of Information Science, City University, London.

Chemistry & Industry (2001), "Policy – EU backs the use of stem cells in research", *Chemistry & Industry*, Vol. 19, 1 October, p. 601.

Balaban, A.T. (1996), "How should citations to articles in high-impact and low-impact journals be evaluated, or what is a citation worth", *Scientometrics*, Vol. 37 No. 3, pp. 495-8.

Birchard, K. (1999), "New European Commissioner for food safety stamps his authority", *The Lancet*, Vol. 354, 18 September, p. 1012.

Boseley, S. (1999), "Doctors throw doubt on safety of GM food", *The Guardian*, 18 May, p. 7.

Bourke, P. and Butler, L. (1996), "Publication types, citation rates and evaluation", *Scientometrics*, Vol. 37 No. 3, pp. 473-94.

Braid, M. (2000), "The siege of Huntingdon", *The Independent, Review Section*, 22 June, p. 1.

Burton, J.L. and Wells, M. (2001), "The Alder Hey affair – implications for pathology practice", *Journal of Clinical Pathology*, Vol. 54 No. 11, pp. 820-3.

Colborn, T., Dumanoski, D. and Myers, J.P. (1996), *Our Stolen Future – Are We Threatening our Fertility, Intelligence and Survival?*, Dutton, New York, NY.

Doll, R. and Peto, R. (1981), "The causes of cancer: quantitative estimates of avoidable risks of cancer in the United States today", *Journal of the National Cancer Institute*, Vol. 66 No. 6, pp. 1191-308.

Dyer, G. (2002), "A shot in the arm for home-grown stem cell research", *Financial Times*, 31 August, p. 3.

(The) Economist (1999b), "Frankenstein foods – seeds of discontent", *The Economist*, 20 February, No. 8107, pp. 19, 105.

Finkel, E., Redfearn, J., Kaiser, J. and Vogel, G. (2001), "ScienceScope: unclear forecast", *Science*, Vol. 291, 2 February, p. 807.

Firn, D. (2000), "Glaxo issues warning over the future of R&D", *Financial Times*, 22 February, p. 2.

Garfield, E. and Welljams-Dorof, A. (1992), "The uses and limitations of citation data as science indicators – an overview for students and nonspecialists, Introduction to citation data – their use as quantitative indicators for science and technology evaluation and policy making", *Science and Public Policy*, Vol. 19, pp. 321-7.

Gough, M. (1989), "Estimating cancer mortality: epidemiological and toxicological methods produce similar assessments", *Environmental Science and Technology*, Vol. 23 No. 8, pp. 935-0.

Grant, J., Cottrell, R., Cluzeau, F. and Fawcett, G. (2000), "Evaluating 'payback' on biomedical research from papers cited in clinical guidelines: applied bibliometric study", *BMJ*, Vol. 320 No. 7242, 22 April, pp. 1107-11.

Gregoriadis, L. (1999), "GM foods overtake BSE as top safety concern, says survey", *The Guardian*, 4 September, p. 6.

Hahn, R.W. (1996), "Regulatory reform: what do the government's numbers tell us?", in Hahn, R.W. (Ed.), *Risks, Costs, and Lives Saved: Getting Better Results from Regulation*, Oxford University Press, New York, NY.

Kmietowicz, Z. (2000), "NICE's appraisal procedures attacked", *BMJ*, Vol. 321, 21 October, p. 980.

Kondro, W. (2000), "Canadian group calls for more environmental-health studies", *The Lancet*, Vol. 356 No. 9233, 9 September, p. 921.

Konisky, D.M. (1999), *Comparative Risk Projects: a Methodology for Cross-project Analysis of Human Health Risk Rankings*, Discussion Paper 99-46, Resources for the Future, available at: www.rff.org/disc_papers/abstracts/9946.htm

Kostoff, R.N. (1998), "The use and misuse of citation analysis in research evaluation – comments on theories of citation", *Scientometrics*, Vol. 43 No. 1, pp. 325-33.

(The) Lancet (1999), "A nasty start for NICE", *The Lancet*, Vol. 354, 16 October, p. 1313.

Laurance, J. (2002), "MMR scare has led to huge slump in child immunisation", *The Independent*, 20 September, p. 2.

Lee, J. (1998), "Directing biomedical research", *The Biologist*, Vol. 45 No. 4, p. 147.

Lehrman, S. (1995), "Ballot urged on ageing centre plans", *Nature*, Vol. 373, 12 January, p. 92.

Leta, J., Lannes, D. and de Meis, L. (1998), "Human resources and scientific productivity in Brazil", *Scientometrics*, Vol. 41 No. 3, pp. 313-24.

Lewison, G. (1998), "Gastroenterology research in the United Kingdom: funding sources and impact", *Gut*, Vol. 43 No. 2, pp. 288-93.

Lewison, G. (2002a), "Researchers' and users' perceptions of the relative standing of biomedical papers in different journals", *Scientometrics*, Vol. 53 No. 2, pp. 229-40.

Lewison, G. (2002b), "From biomedical research to health improvement", *Scientometrics*, Vol. 54 No. 2, pp. 179-92.

Loff, B. (2000), "Informed consent for tissue retention discussed in Australia", *The Lancet*, Vol. 356, 11 November, p. 1663.

McGinnis, J.M. and Foege, W.H. (1993), "Actual causes of death in the United States", *Journal of the American Medical Association*, Vol. 270 No. 18, pp. 2207-12.

Meho, L.I. and Sonnenwald, D.H. (2000), "Citation ranking versus peer evaluation of senior faculty research performance – a case-study of Kurdish scholarship", *Journal of the American Society of Information Science*, Vol. 51 No. 2, pp. 123-38.

Narin, F. (1994), "Patent bibliometrics", *Scientometrics*, Vol. 30 No. 1, pp. 147-55.

Narin, F. and Olivastro, D. (1998), "Linkage between patents and papers – an interim EPO/US comparison", *Scientometrics*, Vol. 41 No. 1-2, pp. 51-9.

Normile, D. (2000), "Asia gets a taste of genetic food fights", *Science*, Vol. 289, 25 August, pp. 1279-81.

Noyons, E.C.M., Luwel, M. and Moed, H.F. (1998), "Assessment of Flemish research and development in the field of information technology – a bibliometric evaluation based on publication and patent data, combined with OECD research input statistics", *Research Policy*, Vol. 27 No. 3, pp. 285-300.

O'Brien, C. (1996), "... as Minister apologizes for misleading", *Nature*, Vol. 384 No. 6610, 19-26 December, p. 604.

Patel, K. (1994), "Viewers switch on to science", *Times Higher*, 24 September, p. 2.

Research Fortnight (2000), "UK falls behind Japan in biomedicine", *Research Fortnight*, Vol. 6, 23 February, p. 4.

Research Fortnight (2002), "What is left to medical science?", *Research Fortnight*, Vol. 8, 10 July, pp. 18-19.

So, C.Y.K. (1998), "Citation ranking versus expert judgement in evaluating communication scholars – effects of research speciality size and individual prominence", *Scientometrics*, Vol. 41 No. 3, pp. 325-33.

Spooner, M.H. (2002), "Measles outbreaks in UK linked to fears about MMR vaccine", *Canadian Medical Association Journal*, Vol. 166 No. 8, p. 1075.

The Times (2001), "Research centre plan rejected by council", *Times Higher*, 5 January, p. 2.

Vidal, J. (2001), "GM trials face delay as crops destroyed: company examines damage to six test sites", *The Guardian*, 9 June, p. 20.

Digital information provision via interactive television: understanding the digital consumer

Barrie Gunter

The author

Barrie Gunter is Professor of Journalism Studies in the Department of Journalism Studies, University of Sheffield, Sheffield, UK. E-mail: b.gunter@sheffield.ac.uk

Keywords

Digital communications, Information retrieval, Television, Interaction, Government departments, Dissemination, Health

Abstract

To achieve its objective of having virtually all its services (central and local) online by 2005, the Government must close the "digital divide", i.e. provide access for those sections of society not yet linked to the electronic, computer-mediated communications environment. There is a need to consider user psychology as well as demography, as shown by research that has evaluated the use and effectiveness of health information and advice services provided via the television. The assumption is that simply providing access to online public services via the country's most widespread and popular mass medium will guarantee their success, but this assumption is naïve in terms of its understanding of viewer psychology. To ensure success, it is essential to know more about the usability and application effectiveness of interactive services provided through television. This paper explores key concepts of platform availability, use and access, service and information access, service use and application effectiveness.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings: New Information Perspectives
Volume 55 · Number 1/2 · 2003 · pp. 43-51
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310462706

Introduction

The Labour Government has entered a commitment to turn Britain into the most advanced online nation in the world. This undertaking is aimed at creating an infrastructure through which private citizens, businesses and communities are linked to the Internet and are able to use it for a variety of personal and commercial transactions. A significant part of this development will be the provision of online government services. Driven forward by the Office of the e-Envoy, the Government has announced three primary objectives. First, to make the UK the best environment in the world for e-commerce by 2002. Second, to ensure that everyone who wants it has access to the Internet by 2005. Third, to make all (or virtually all) government services available electronically by 2005.

To achieve its objectives, the Government must work to close the so-called "digital divide". This concept identifies a division in society between people who have access to and the ability to use new information and communication technologies (ICTs) and those who do not. It has long been recognised that new ICTs are not taken up by everyone at the same rate (Rogers, 1962, 1995). There are those (innovators and early adopters) who are more venturesome and are quick to adopt any innovations and then there are those (late majority) who are much slower to do so. A few (the laggards) may never try out new ICTs.

Receptivity to new technologies has been associated with demographic factors such as age, socio-economic class, level of education and disposable wealth (Reagan, 1995; Lin, 1998; Dupagne, 1999; Wei, 2001). Younger, better-off and better-educated people are more likely to be early adopters of new ICTs (Garramone *et al.*, 1986; Lin, 1998).

In the UK, the Government has taken steps to overcome the digital divide particularly with respect to the provision of online public services. It has recognised that some social groups may lack personal reception access for various financial, social or educational reasons. Major investment has therefore been made in UK online centres in local communities around the country. These centres – many situated in public libraries – will offer free or low-cost access and elementary training in the use of computer-mediated communication (CMC) such as e-mail and the Internet. These online centres will help people develop the skills to use the Internet to access information and will teach them how to send an e-mail via a personal computer, mobile phone or digital interactive television (DiTV). By the end of 2002, 6,000 centres should be in operation (4,300 in public libraries).

In 2001, there were 520 central government services to citizens or business, of which 256 (51 per cent) were electronically enabled. The Government's target is for 513 of these services (99 per cent) to be provided online by 2005.

Health information online

Amongst the public services destined for online provision is a range of health-related services. The policy document *Information for Health* was underpinned by the notion that widespread public access to the right kind of health information is a core ingredient of modern health care (NHS Information Authority, 1998). The realisation of this online objective for health has been manifest in terms of the major NHS Direct initiative that deploys a battery of information services available over the telephone, on the Web, via touch-screen kiosks and DiTV. Mobile communications may yet provide a further platform for these services.

Behind all these initiatives lies the assumption that the very act of providing people with information and access to online transactional services (such as booking appointments with health professionals, online consultations, etc.) will lead to a better health outcome for society. In theory, patients will be able to consult with their doctor or a nurse or other type of health professional over remote text, audio or video links from within their own homes. It has been hypothesised that such a system will offer greater convenience for patients and service economies for the National Health Service (NHS). To what extent, however, will the anticipation be matched by the actual success of such services? Given the cost of up-front investment in ICTs that is required to put these online services in place, the effectiveness with which they eventually operate cannot be left to guesswork and should not depend solely on long-term trial-and-error experiences. There is a need for systematic and carefully contrived formative research to explore how such services will be used and how people will respond to different types of online application on different communications platforms.

It is already known that patients do welcome health information that they can take away and peruse at their leisure. Furthermore, they attach credibility to the information they receive from authority figures such as their GP. Written information can increase patient compliance with their doctor's instructions (Arthur, 1995; Ley, 1982). Information leaflets have also been found to contribute to better health outcomes (Greenfield *et al.*, 1985; Mazzuca, 1982). The provision of information online is another matter however. Important questions have already been raised about the quality of online health information, especially where the source of that information or its authority and credentials are not disclosed (Ferguson, 2002; Impicciatore *et al.*, 1997). Yet, there is evidence that patients are turning to online sources such as the Internet and are using health and medical information they find there to second-guess their GPs (Rumbelow, 1999).

Access and the user

The integration of technology with the provision of public services is regarded by Government as an important democratic development. It is all about putting the citizen first. The prevailing perception is that the public wants better access to services and that putting them online is one way of satisfying the public's needs. The emphasis so far, however, has centred very much on technology access. The Government's priority is to ensure that as many people as possible are linked to online technologies. In parallel with this development, there has been a drive to get as many public services online as quickly as possible. To facilitate ambitious technology roll-out targets, the broad aim is to provide online services over as many communications technology platforms as possible. This means using the PC-based Internet, touch-screen kiosks, mobile phones and other mobile technologies (PDAs), and DiTV (cable, satellite, broadband). While access to technology is a prerequisite of online service use, it does not by itself guarantee that use will take place.

The multi-platform scenario is likely to deliver greater service reach, since different communications technologies are not taken up to the same extent by different segments of the population. New ICTs can take time to become established in a usability context, even though access has been widely achieved. Upgrades to longer-established technologies may prove more fruitful because those technologies are already widely used. The latter distinction is illustrated by the respective potential of the PC-based Internet and DiTV. Television as a technology is already widely established, while the Internet is the new kid on the block. The full potential of the Internet as a service delivery technology will not be realised until a broadband platform has been more widely rolled out at a price people are prepared to tolerate. This is because broadband technology will upgrade the capacity of the Internet to facilitate the speedy and effective transmission of complex and dynamic multi-media formats that will bring this medium into more direct competition with broadcast television as a source of home entertainment and information.

User psychology

Even established technologies such as television may not guarantee the success of online public services – in terms of their use – when utility of such services requires a different psychological orientation towards the medium. This issue goes beyond the acquisition of basic skills in ICT use. Certainly, while we may be able to access the Internet via a desktop PC at home, our ability to use it will restrict the effectiveness with which it is used. In addition to this fairly obvious observation though is a less frequently considered issue of whether we feel comfortable engaging in any kind of transaction over the Net. This last consideration is a psychological one.

Television may be a familiar technology to most people and certainly more familiar than the PC-Internet. Television, however, is traditionally a passive medium. Accessing online public services on a DiTV platform invokes a shift in psychological orientation, whereby television is treated as an interactive medium. Another way of putting it is to say that the PC is a "lean forward" technology, while the television is a "lean back" technology. With a computer, users are accustomed to engaging with the technology interactively because that is part of the inherent nature of the machine. With a television set, users are accustomed to switching it on and letting its content wash over them in a more passive mental mode.

Hence access does not mean success in the context of online public service roll-out. Less familiar technologies have to become not only more widely distributed but also more familiar to more people. With more familiar technologies that have established usage patterns and psychological orientations, users must be re-conditioned to approach them in a different way. Television viewers must be able to shift readily from watching mode to transacting mode. The achievement of this objective means that more attention should be focused on usability issues.

Usability issues

Online public services must be easy and effective to use if they are to be accepted and utilised as widely as Government would like. During the development of such services, therefore, more attention should centre on establishing the "usability" and "application effectiveness" of these services for users. Usability here is taken to mean that the interface through which users engage with online services is easy to understand and utilise. Application effectiveness means that the most appropriate communications formats are utilised for given services. These factors underline the need to understand user psychology as well as demography.

In considering user-related issues with online technologies, there are four sets of assumptions that need to be dispelled. These are concerned with the availability of technologies, their access, their use, and their effectiveness. These issues can be encapsulated in four propositions:

P1. Platform availability does not equal platform use.

P2. Platform sccess does not equal service Access.

P3. Service sccess does not equal information access.

P4. Service use does not equal application effectiveness.

Each of these propositions will be considered in turn with supporting evidence from relevant empirical research. The platform principally under consideration here is digital interactive television. Most of the evidence will derive from research conducted to evaluate the provision of online health information via television.

Platform availability ≠ platform use

The argument under this heading is that merely because people have a technology platform available to them does not mean that they will use it. This point is underscored by evidence for the UK on penetration and use of PC-Internet and DiTV technologies.

In 2001, a survey commissioned by the Independent Television Commission (ITC) found that 35 per cent of television set owners in the UK (98 per cent of the population) owned PCs with Internet access (Towler, 2002). The same survey reported that 40 per cent of UK television viewers had access to DiTV (24 per cent via satellite, 11 per cent via cable and 5 per cent via terrestrial transmissions).

Among DiTV viewers, one in five (19 per cent) said they used interactive services on this platform at least once a week. A clear majority of these viewers (62 per cent), however, said that they never used interactive services. Men (46 per cent) reportedly used interactive services more than did women (29 per cent). Non-use of interactivity on DiTV was especially high among the over 65s (70 per cent). While interactivity was fairly limited, amounting to choice of camera angles in sports broadcasts and access to more detailed story content in news broadcasts, what these findings indicate is that availability to interactive services on television does not guarantee their use. Furthermore, the interactive services available at the time of this survey were not complicated to use.

Other evidence has indicated that viewers are prepared to interact with their television set if an application really grabs their interest. Sky Digital, the direct-to-home satellite broadcaster in Britain, released an interactive game called Gamestar in March 2002 and attracted 1.4 million players a week. These games, however, attracted mostly young people and the success of DiTV as a purveyor of public services in the future will depend upon its ability to persuade a much wider demographic cross-section of the public to treat television in a "lean-forward" manner.

Platform access ≠ service access

If DiTV is to prove an effective platform for interactive public services, users must be able to find the service they want from among the multitude of other services provided in a multi-channel television environment. Online public services could literally be swamped in a digital television package containing perhaps 200 or more services. Online public services in a DiTV environment will therefore have to address their "digital visibility" in this crowded digital environment.

Accessing services in this type of television environment takes place through the electronic programme guide (EPG). This is not simply an on-screen television guide that provides advance information about programmes. It is the gateway to the services themselves. The EPG is both a menu of the services on offer and an access point through to the underlying content – whether interactive or non-interactive. EPGs tend to be hierarchical, offering at first a short list of super-ordinate service or channel category headings giving access to a second level that offers lists of the services under their specific category heading. At the second level, the service lists can get quite long, typically running to more than three screens. Each screen may contain ten services. Some channels – usually the historically longest-established, mainstream television channels and premium subscription channels (e.g. movie channels and major sports channels) occupy prime positions at the heads of these menus.

The service lists are likely to grow longer in the future. Since many interactive public services will be offered as "walled gardens", that is services that are separately listed alongside mainstream television channels (rather than as enhanced services lying beneath and linked to sequential programme services), they will have to be searched for and identified from the service lists. If such services are placed far down the list and not clearly labelled for what they are, users may have difficulty finding them and could easily miss them even when they have reached the right screen. As evidence to be presented in the next part of this paper indicates, television viewers have a low tolerance for working hard to find interactive services in multi-channel environments.

Service access ≠ information access

The public's confidence in online public services piped through their television sets will be enhanced if these interactive services can be used readily. Once a public service has been located on a television platform, it must be easy to find information on it. This does not mean simply being able to locate the service among a large suite of other channels. It also means that once the service has been found that the information and transactional capabilities it contains are themselves easy to access. This point is especially important given that many users or potential users of interactive public services on a television platform may lack the technology literacy of early adopters of the Internet.

The fact that a service has been accessed does not mean then that service information can also be readily accessed. This point was illustrated in the digital health research undertaken by a group of researchers associated with ciber (Centre for Information Behaviour and Evaluation of Research) at City University on behalf of the Department of Health. This research group evaluated four DiTV pilot projects that tested distinctive interactive health information and advice services on satellite and cable DiTV and broadband platforms. The significance of ease of movement from the initial platform environment interface to specific service content was reinforced in an evaluation conducted with one of these four pilot digital health projects.

In this case, a service called NHS Digital Direct was produced by Communicopia and transmitted on the broadband platform operated by Kingston Interactive Television (KIT) in Hull. The service comprised text and video-on-demand information covering a wide range of health topics. The service was provided alongside a range of other entertainment and information services in the KIT environment. Over a pilot period extending several months, a number of changes occurred to the position of NHS Digital Direct on the KIT platform (see Nicholas *et al.*, 2002).

In an initial period spanning around 12 weeks, two menu levels were in operation. One of these was the platform Home page for the overall range of services provided by KIT. Within this was a further Local Link menu. At this time, NHS Digital Direct could be accessed both directly from the Home page and also via the Local Link menu. Users therefore had more than one route through to the service and did not have to explore very far before accessing it.

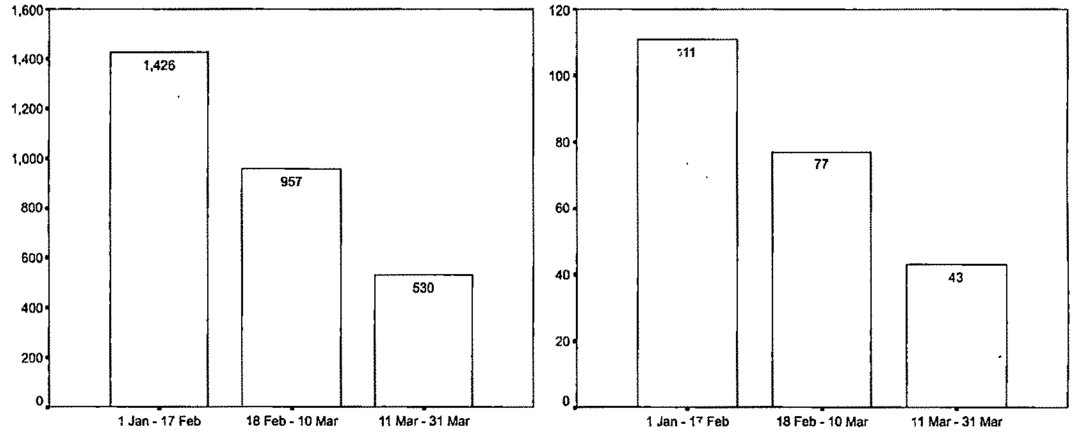
In a second period, that spanned around four weeks, there were again two relevant menu levels: the Home page and the Local Link menu. At this time, however, the direct link to NHS Digital Direct from the Home page was removed. Users now had to click through to the Local Link page and then click again to reach the health information service. In a third period, the menu structure shifted again from a two-level system to a three-level menu. This comprised a Home page menu at level one, a further platform operator menu at level two, and then a further page within the level two menu that revealed a level three menu through which digital health content could be accessed. At this stage then, users had to navigate three screens to find the digital health service as compared with two screens in the two earlier phases.

Digital logs were used to monitor real-time use of this service. These logs registered levels of use for different parts of the service and yielded a number of user-related metrics. Measures were taken of the numbers of text screens and videos viewed across the three periods outlined above. Volumes of use fell across these periods as access to the digital health service required progressively more effort on the part of users.

From period one to period two, when access to the digital health service shifted from being one click away to two clicks away, there was a 33 per cent decline in number of text screens viewed and a 29 per cent decline in numbers of videos viewed. From period two to period three, when access shifted from being two clicks away to three clicks away, there was a 45 per cent decline in text screens viewed and a 35 per cent decline in videos viewed (see Figure 1). NHS Digital Direct attracted an average of 50 users per day who viewed about 1,700 text pages and 140 videos during the latter part of period two. This level of use fell to 15 daily users viewing about 500 text pages and 40 videos during period three.

These findings provide a clear illustration that in a "lean-back" television environment, interactive public services must be readily

Figure 1 Daily average (median) number of (a) text screens and (b) videos viewed by menu period



(a)
text screens

(b)
videos

Source: Nicholas *et al.* (2002)

accessible once the service as a whole has been located on the platform menu. Any extra effort that is imposed upon users by the service supplier or platform operator – even as little as one additional click on the remote control – could have significant implications for overall levels of service use.

Service use ≠ application effectiveness

Application effectiveness depends upon finding the most suitable format for conducting certain types of information enquiry or communication transaction. Traditionally, the choices of communication channel have been limited, comprising spoken face-to-face, telephone, and written (hard copy) forms. In the digital communications environment, the options have expanded to include video links, electronic mail and voice mail. Electronic communications can be conducted one-on-one or in a group format. Such communications can be asynchronous (a message is sent and a reply despatched some time later) or synchronous (two-way simultaneous communications). Once a user has located an interactive service on a multi-channel platform and navigated their way through to the required service content or transactional link, does the format offered provide the most appropriate or satisfactory modality through which to complete an enquiry or transaction?

Application effectiveness is likely to be a key factor that underpins the longer-term success of interactive public services. In the health context, for example, most users may be perfectly happy to search text-based information in undertaking a general information enquiry. A person suffering from a specific medical condition, however, may draw additional comfort from viewing video that features real people who also suffer from that same complaint. One reason for this may be that the sufferer may seek emotional support and reassurance as well as factual information with regard to their condition, and this can be supplied more effectively in a video format than in a text format. In both these cases, the communication links are asynchronous. There may be occasions when synchronous links are needed.

Someone suffering from a medical condition that is currently giving them cause for concern may need to speak to a health professional immediately. Watching a pre-recorded video will not suffice. They need immediate advice or diagnosis. In this case, the opportunity to speak to a qualified professional on the telephone or actually being able to see that person via a live video link may be more appropriate.

One important concept associated with application effectiveness in the interactive communications context is "social presence". The social presence model claims that communication media vary in the degree to which they can convey the physical presence of communicators (Short *et al.*, 1976). The model arranges media along a continuum from low (written numeric or textual content) to high social presence (e.g. face-to-face communication). It is further contended that individuals will select the medium that they perceive to have the highest social presence.

Another related model is media richness theory (Daft and Lengel, 1984). This theory posits that people select communication technologies based largely on the attributes of the medium. Again, media can be arranged on a continuum from "lean" to "rich" based on their speed of feedback, variety of channels, friendliness of source and richness of language used. Media richness theory also considers the context of use and proposes that individuals will seek to match the richness of a communication medium with the complexity of the task for which it is used.

Some of the earliest research reported that newer media were rated by users as more appropriate for information exchange tasks requiring lower social presence (Trevino *et al.*, 1987; Rice, 1993). Compared with direct face-to-face (FtF) communication, for example, computer-mediated communication (CMC) was reportedly ranked low in social presence (Perse and Courtright, 1993). Later research challenged this notion of CMC, however. Indeed, engagement with computers was reported frequently to take on the same tenor as interpersonal communication (Reeves and Nass, 1996). CMC can be used for socio-emotional tasks just as readily and effectively as can FtF communication (Joinson, 2001; Parks and Floyd, 1996; Walther, 1996). The rules determining the nature of communication via computers often resemble those that govern the way individuals interact face-to-face (Lee and Nass, 2002). While certain communication cues in the FtF context are missing in the CMC context, skilled exponents of CMC find ways of enhancing the form of communication in that environment and may nevertheless engage in emotionally fruitful encounters with others in that context (Tidwell and Walther, 2002).

This background is important to the establishment of public services online, especially where such services may involve a range of different types of CMC interaction between members of the public and public service providers. In the digital health research, although not systematically investigated, the significance of social presence and media richness emerged through a number of the findings (see Nicholas *et al.*, 2002).

The digital health television pilots provided information in text and video form and offered access to transactional services such as online appointments booking with GPs and other health professionals and live telephone and video links to NHS nurses. Text information about medical conditions that was provided online via the television was valued by many of its users.

In relation to one pilot operator that provided a largely text-based information service via cable television in Birmingham, a postal survey of self-identified service users indicated that over four in ten (44 per cent) sought information relating to their own medical condition, while one in four (25 per cent) sought it for friends and family. Over eight in ten users of this information (81 per cent) said they found the text information useful. Over four in ten users (43 per cent) said that the health text information helped a lot in dealing with their doctor.

There were other individuals, however, who did not use this digital health service even though it was available to them at no extra charge as existing cable subscribers. Among these non-users, lack of use among some was attributed to not being very good with interactive technology (17 per cent) or not being able to find the content they wanted within the digital health service (7 per cent). Far more of these people, however, said that their doctor tells them all they need to know about their medical condition (24 per cent) or that they preferred to receive printed information from their doctor about a condition (40 per cent). These findings suggest that avoidance of an interactive television health information service may occur among some potential users because they prefer to go direct to their doctor for such information. DiTV may lack sufficient media richness for these individuals as compared with direct physical contact with the GP.

The same digital health television service provided access to a transactional link with a local NHS Direct call-centre. Through this service, users could telephone the call-centre and simultaneously see on their television screen the nurse to whom they were talking. The user at home could ask the nurse any questions about their medical condition and the nurse would offer advice and information. The visual element could be further utilised by the nurse who could show pictures, charts and video clips to the user where they proved relevant as part of the response to the enquiry.

Users on this online video link found the service helpful. What was particularly interesting, however, was that many callers (36 per cent) sought reassurance as much as specific medical help. Users offered comments such as "you feel reassured by her [the nurse's] body language" and that it is "easy when you can see her face ... a lot more personal ... more human". The encounter was described as "like being face-to-face ... felt as though she was there". One caller observed "when you talk blindly on the phone you have no idea whether they are just going through the motions" (Nicholas *et al.*, 2002). Again, these remarks provide qualitative evidence that is consistent with the notions of media richness and social presence. In this example, video links offer a richer format than text or even audio links. For certain types of health-related enquiry, users need to see as well as hear whom they are dealing with. Where there is an emotional need in addition to an information need, pictures may speak louder than words.

Conclusions

The roll-out of digital technology is obviously essential if society as a whole is to reap the benefits of online public services. Without access to the delivery technology, the public cannot receive electronic services. Putting the infrastructure in place has therefore been at the forefront of planning for the future digital world. As the analysis presented in this paper has indicated though, infrastructure is not everything. Even when virtually all public services have been e-enabled and most people have reception technology either at home or within easy reach at a public location in their community, the effective utilisation of these services requires a number of other important considerations.

Two key elements that will underpin the success of online public service provision are the usability and application effectiveness of these electronically communicated services. These two concepts invoke a change of orientation towards understanding digital consumer psychology. In particular, there is a need to recognise that even when adapting an established medium such as television to provide interactive capability, viewers will not universally shift their mindset towards the medium. While there may be certain advantages in utilising television in the context of closing the digital divide, where the latter is envisaged primarily as a matter of demographics, such a development omits to take fully into account the significance of audience psychology.

Even when most viewers have been cultivated to regard television as a "lean forward" as well as a "lean back" medium and can engage with the medium in both ways, there remains the issue of finding the best formats for particular kinds of information enquiry and for conveying specific types of transaction. Recognition of the differential social presence and media richness afforded by different communication formats is a matter of paramount importance. Future research with CMC in the public service context must establish the most appropriate and effective formats for different types of online task. Only then can the digital divide truly be closed and online public services enjoy longer-term acceptance and success.

References

Arthur, A.M. (1995), "Written patient information: a review of the literature", *Journal of Advanced Nursing*, Vol. 21, pp. 1081-6.

Daft, R.L. and Lengel, R.H. (1984), "Information richness: a new approach to managerial behaviour and organisation design", in Staw, B.M. and Cummings, L.L. (Eds), *Research in Organizational Behavior*, Vol. 6, JAI Press, Greenwich, CT, pp. 191-233.

Dupagne, M. (1999), "Exploring the characteristics of potential high-definition television adopters", *The Journal of Media Economics*, Vol. 12 No.10, pp. 35-50.

Ferguson, T. (2002), "From patients to end users", *British Medical Journal*, Vol. 324, pp. 555-6.

Garramone, G.M., Harris, A.C. and Anderson, R. (1986), "Use of political computer bulletin boards", *Journal of Broadcasting & Electronic Media*, Vol. 30 No. 3, pp. 325-39.

Greenfield, S., Kaplan, S. and Ware, J.E. (1985), "Expanding patient involvement in care; effects on patient outcomes", *Annals of Internal Medicine*, Vol. 102 No. 4, pp. 520-8.

Impicciatore, P., Pandolfini, C., Casella, N. and Bonati, M. (1997), "Reliability of health information for the public on the World Wide Web: systematic survey of advice on managing fever in children at home", *British Medical Journal*, Vol. 314, pp. 1875-979.

Joinson, A.N. (2001), "Self-disclosure in computer-mediated communication: the role of self-awareness and visual anonymity", *European Journal of Social Psychology*, Vol. 31 No. 2, pp. 177-92.

Lee, E.-J. and Nass, C. (2002), "Experimental tests of normative group influence and representation effects in computer-mediated communication: when interacting via computers differs from interacting with computers", *Human Communication Research*, Vol. 28 No. 3, pp. 349-81.

Ley, P. (1982), "Satisfaction, compliance and communication", *British Journal of Clinical Psychology*, Vol. 21 No. 2, pp. 241-54.

Lin, C. (1998), "Exploring personal computer adoption dynamics", *Journal of Broadcasting & Electronic Media*, Vol. 42 No. 3, pp. 95-112.

Mazzuca, S.A. (1982), "Does patient education in chronic disease have therapeutic value?", *Journal of Chronic Disease*, Vol. 35, pp. 521-9.

NHS Information Authority (1998), *Information for Health*, National Health Service, London.

Nicholas, D., Huntingdon, P., Williams, P. and Gunter, B. (2002), *First Steps Towards Providing the Nation with Health Care, Advice and Information Via Their Television Sets*, report to the Department of Health, Centre for Information Behaviour and Evaluation of Research (ciber), City University, London.

Parks, M.R. and Floyd, K. (1996), "Making friends in cyberspace", *Journal of Communication*, Vol. 46 No. 1, pp. 80-97.

Perse, E.M. and Courtright, J.A. (1993), "Normative images of communication media: mass and interpersonal channels in the new media environment", *Human Communication Research*, Vol. 19 No. 4, pp. 485-503.

Reagan, J. (1995), "Classifying adopters and non-adopters for technologies using political activity, media use, and demographic variables", *Telematics and Informatics*, Vol. 4, pp. 3-16.

Reeves, B. and Nass, C. (1996), *The Media Equation: How People Treat Computers, Televisions and New Media Like Real People and Places*, Cambridge University Press, Stamford, CA.

Rice, R.E. (1993), "Media appropriateness: using social presence theory to compare traditional and new organisational media", *Human Communication Research*, Vol. 19 No. 4, pp. 415-84.

Rogers, E.M. (1962), *Diffusion of Innovations*, Free Press, New York, NY.

Rogers, E.M. (1995), *Diffusion of Innovations*, 4th ed., Free Press, New York, NY.

Rumbelow, H. (1999), "Doctors usurped by the Internet", *The Times*, 6 November, p. 7.

Short, J., Williams, E. and Christie, B. (1976), *The Social Psychology of Telecommunications*, Wiley, London.

Tidwell, L.C. and Walther, J.B. (2002), "Computer-mediated communication effects on disclosure, impressions, and interpersonal evaluations: getting to know one another a bit at a time", *Human Communication Research*, Vol. 28 No. 3, pp. 317-48.

Towler, R. (2002), *The Public's View 2001*, Independent Television Commission, London.

Trevino, L.K., Lengel, R.H. and Daft, R.L. (1987), "Media symbolism, media richness and media choice in organisations: a symbolic interactionist perspective", *Communication Research*, Vol. 14 No. 3, pp. 553-75.

Walther, J.B. (1996), "Computer-mediated communication: impersonal, interpersonal, and hyperpersonal interaction", *Human Communication Research*, Vol. 23 No. 1, pp. 3-43.

Wei, R. (2001), "From luxury to utility: a longitudinal analysis of cell phone laggards", *Journalism & Mass Communication Quarterly*, Vol. 78 No. 4, pp. 702-19.

Comparing the use of two DiTV transmission services: same service, different outcomes

Paul Huntington
David Nicholas and
Peter Williams

The authors

Paul Huntington, David Nicholas and Peter Williams are all at the Centre for Information Behaviour and the Evaluation of Research (ciber), Department of Information Science, City University, London. E-mail: nicky@soi.city.ac.uk; URL: www-digitalhealth.soi.city.ac.uk/isrg/doh.htm

Keywords

Digital communications, Television, Metrics, Health service, United Kingdom, User studies

Abstract

NHS Direct Digital was available to almost exactly the same number of users in both Hull and London via two different transmission DiTV companies: Kingston Interactive Television (KIT) and HomeChoice. This paper employs metrics based on server generated logs to compare use and user differences between the two services. Server logs that record user activity on a real-time and continuous basis were made available and used to make comparisons between the two services. The data were collected for both services over a similar period, February 2002 to May 2002. During this period the NHS Direct Digital service was visited by approximately 3,000 people and more than 5,000 NHS Direct videos were viewed. Making the study probably the largest analysis of health videos ever conducted.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings: New Information Perspectives
Volume 55 · Number 1/2 · 2003 · pp. 52-63
© MCB UP Limited
ISSN 0001-253X
DOI 10.1108/00012530310462715

Introduction

There is a considerable literature on Web metrics, but very little, if any, on digital interactive television (DiTV) metrics. This is not surprising because of the relative novelty of DiTV, but given the rapid growth and importance of this medium metrics will soon have to be developed and pressed into service to chart progress and effectiveness of this much hyped medium. In fact DiTV pages are stored and delivered to the user in much the same way as Web pages. Hence much of the research conducted on Web metrics is applicable to the DiTV environment. Web metrics have been developed over a relatively short period of time (Stout, 1997; Williams, 1999; Gutzman, 1999; Nicholas *et al.*, 1999). Indeed, most of the metrics are not wholly new and their origins can be traced back to research on OPAC log files (Peters, 1989; Nicholas, 1996). Typically, the metrics used are the number of pages or screens viewed (page impressions), number of users/visitors, time spent viewing a page, number of pages viewed per search session, session time length and the number of screens printed or downloaded (Nicholas *et al.*, 1999, 2002). Time measures are calculated from the date and time stamp field and pages viewed by counting and verifying transaction lines.

DiTV logs do follow the Internet conventions of recording the time that the client requests the page, although a log off time is not recorded and, as a consequence, this introduces problems with dealing with highly skewed data. There are, however, important differences between the two platforms that have consequences for the metrics employed. Thus, unlike the Internet, DiTV pages are not normally cached to a client's machine, although DiTV pages may be cached if the service is routed through local distribution server hubs. Furthermore, there are no spiders and robots actively collecting information in the DiTV network that have to be discounted. The DiTV network is much more like an intranet where users are paid up members accessing a server. And thus it is possible to identify individual users, something almost impossible to do on the Web – and this is a huge bonus for researchers.

As part of an ongoing Department of Health funded research project[1] evaluating the impact of DiTV health channels the authors have been testing metrics to chart the use and impact of these channels. This work is reported here.

Aims, objectives and scope of the study

The aims of the research were to use server log based metrics to compare and contrast two DiTV information transmission services delivering the same content, but to two different communities in the UK. The content in this case was, unusually, 110 NHS videos covering such topics as diabetes, blood donating and childhood eczema. All the videos were produced by Communicopia Ltd which was also responsible for negotiating with the distribution companies regarding transmission.

In addition to the ubiquitous "visitors" (individual identifiable addresses) and pages viewed metrics, the following were also employed:

- average number of videos viewed per visitor;
- session types (single page sessions, single daily session and multiple user sessions in a day) and session numbers;
- reach (the percentage of those who had access to the service who viewed the service at least once during a fixed time period); and
- re-visits to the site.

Site backgrounds

Two services were compared: that of NHS Direct Digital distributed by HomeChoice, which has about 10,900 subscribers; and NHS Direct Digital distributed by KIT Interactive, which has 10,000 subscribers. The current paper looks only at the logs of the on-screen information services of each. However, it is worth describing all of their services by means of providing context.

NHS Direct Digital via Home Choice

The "NHS Direct" via HomeChoice service consists of two elements:

(1) limited text and images; and
(2) "on-demand" short video programmes (the logs of which are analysed in this paper).

The HomeChoice was available to cable TV-on-demand subscribers in the London area. The service was predominately a video service. The main menu of the service is structured on one main menu before arriving at a screen from which the user can download a video.

Text service

Text is displayed by overlaying the text on to a video background. The main text elements, other than the opening video/text introduction and main menu, were details of local hospitals. The hospital details were text and graphics overlaid onto a moving video background. The only other use of text was for the quizzes and questionnaires, and these again were overlaid onto a moving video background.

Video service

This consists of 110 videos. However, videos are grouped into topics. A topic such as coronary heart disease will be covered by a number of short videos accessible independently and in the order decided by the viewer. They are thus, as far as possible, self-contained. The service is structured so that a video can be downloaded two screens from arriving at the service.

"NHS Direct" via KIT

The "NHS Direct" via KIT service consists of:

- text, images, and audio;
- "on-demand" short video programmes, the logs of which are analysed in this paper; and
- an online immunisation diary, whereby subscribers could maintain personal immunisation records on their TV set.

The NHS Direct service, via KIT, was available to broadband digital TV-on-demand subscribers in the Hull area. The main menu of the NHS Direct service is structured on up to four hierarchical menus before arriving at information content. The content pages list, on the right hand of the screen, the other menu options at the same hierarchical level for that particular topic. The principles of navigation are that numbers are used to move forward and backwards through pages and menus, rather than the words "next page" or "previous menu". The content of this NHS Direct service differs from the HomeChoice in that it has much more text information.

Text service

This is distributed over a number of menus, the main ones being:

- *Not feeling well?* This part of the service allows the viewer to choose a part of the body (head and chest, abdomen, limbs, or skin) and to choose from a list of possible symptoms, or to choose from a full list of all 54 symptoms. (Unfortunately, this list has not been sorted alphabetically, but puts the four previous menus on top of each other!) The viewer then has to answer yes or no to a series of questions which leads them to a possible diagnosis and a suggested course of action (e.g. see GP, phone 999).
- *A-Z of conditions*. This section lists 274 conditions. The section contains 3,661 pages of information. For each condition, information includes symptoms, causes, diagnosis, prevention and treatment.

  There are also sections on "First aid", "Medicine cabinet" (a searchable A-Z index of 149 medicines), "Healthy living" and "Local information". The latter includes information on blood donation (including a video) and details of local doctors, hospitals and pharmacies.

Video service

The "on-demand" video collection comprises 12 introductory menu videos and 28 video content or topics. The former give an overview of the service and its navigation and features. The latter consists of approximately 100 videos. A topic such as coronary heart disease will be covered by a number of short videos accessible independently and in the order decided by the viewer. They are thus, as far as possible, self-contained. The videos are made available as sub-menus to the text service.

The video on-demand service is an innovative and new way of presenting health information and issues related to usability of the service were considered a concern. In focus groups[2] with non-DiTV users, participants struggled to select and play multiple videos. Further, some participants did not take in the instructional text and so did not realise the need to tick videos. Others read the text, but having ticked the videos were unsure how to play them. They were looking for an obvious route to play the video, for example, the word "play" or a "play video" icon. This finding was at odds with data collected by questionnaire of users of the NHS Direct text and video service on KIT, only 6 per cent of users said it had been difficult to access the health video service. KIT is a video on-demand service and NHS videos were introduced without regard to how users normally download videos. While quirks of the system may seem unintuitive to focus groups (non-users) it is thought that usability was not such an issue with the larger KIT or HomeChoice subscriber base. Questionnaire evidence did point to difficulty in using the text and video parts of the KIT service by older users. Users aged 55 and under generally found KIT easier to use compared to older users. Female older users in particular found the service difficult, though females under 36 found it easier and this group seemed confident in using the technology.

Methodology

Log files are machine-generated records of user activity. DiTV logs are similar to those of other digital platforms and a detailed explanation of how the data is analysed can be found in a number of articles published by the authors (Nicholas *et al.*, 2001a, b).

Log files related to videos are a record of video requests delivered by the server to the client. Typically the information recorded is the identification of the client, the time and date of each video delivered and the name of the video delivered. The exact amount of information collected will depend on the software used and how the server was configured. A typical DiTV video log line (from NHS Direct Digital) looks like:

```
Feb 1 00:23:06.270 924370037
nhs_00aq00039.mpi
Feb 1 00:22:12.870 924370037
nhs_00aq00100.mpi
Feb 1 00:26:03.970 924370037
nhs_00aq00096.mpi
Feb 1 00:30:54.010 924370037
nhs_00aq00047.mpi
```

The lines in the script give the following data:

- Feb 1 00:23:06.270 records the date and time of the request.
- nhs_00aq00039.mpi is the identification number of the video downloaded and is looked up via a database procedure to extract the video title name.
- 924370037 is the user's ID number.

Across the two DiTV services examined here, logs were available from February to May 2002. During this period NHS via HomeChoice registered 1,581 individual visitors and via KIT 1,594 visitors – very, very similar numbers.

Data were obtained from an analysis of server log files, only server logs related to videos were compared:

(1) *NHS Direct service via KIT*. Logs of this service were recorded on two servers. Transactions related to the view of text pages and text menu screens were recorded on a server held by Communicopia. Views to videos were recorded separately by KIT. The two sets of log files were made available to the research team however in such a way that two files of use could not be combined. The log text file did not record the user's unique identity number instead users were allocated a floating session identity number. A unique user number was recorded on the video transaction log files.

(2) *NHS Direct service via HomeChoice*. Log files were recorded and stored in a database. Fields related to individual transactions were made available to the research team. These fields included a field recording the user's unique identification number, as well as screen or video view and time of download.

Respondents' characteristics

A questionnaire sent to subscribers of each service indicated that HomeChoice had more female users for its NHS Digital service (52 per cent) – see Figure 1 for details. The reverse was true for KIT, more men (55 per cent) were found to be users. But for both transmission services most users of NHS Direct fell within the age group 35 to 54 (Figure 2). However, users via KIT tended to be older: 41 per cent of users via KIT were over 55 years old, whilst only 7 per cent of HomeChoice users fell into this age bracket. Those connecting to the NHS service via HomeChoice tended to be younger: 47 per cent were aged under 35 compared to 21 per cent of KIT users who fell into this age group.

Figure 1 Gender distribution of NHS Direct Digital users (KIT and HomeChoice)

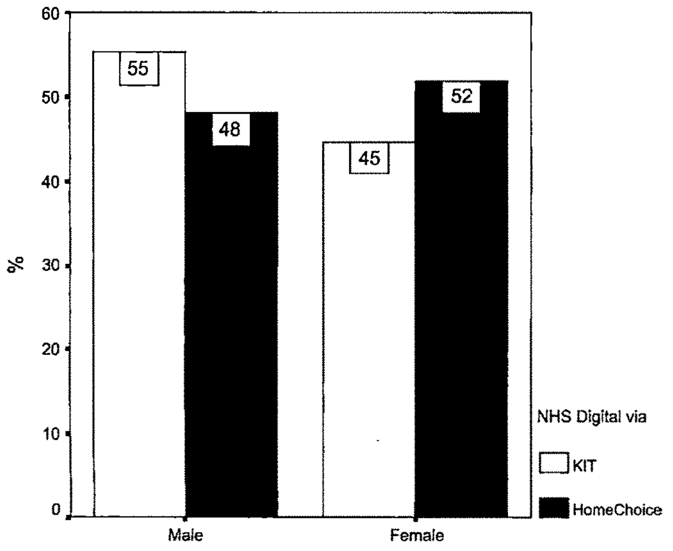
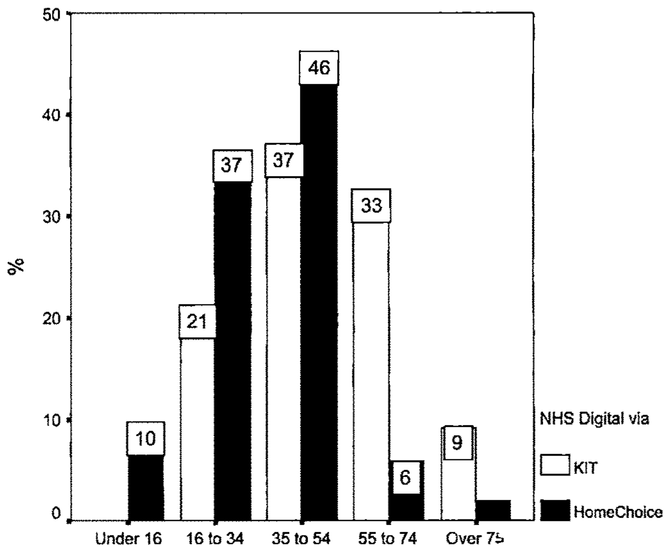


Figure 2 Age distribution of NHS Direct Digital users (KT and HomeChoice)



Results

User numbers

The services were compared over the four month period February to May 2002. During this period a total of 3,175 individual users of the services were identified. A reasonable take up from a standing start – there had never been any service like it as far as these users were concerned. The NHS Direct service via KIT was used by 1,581 users, whilst 1,594 HomeChoice users had used the service. The reach figure, the percentage of subscribers who had used the service, for both was about 16 per cent. The data are amazingly similar given the very different nature of the two communities (Hull is not London after all).

Figure 3 gives the daily plot of NHS Direct Digital users broken down by delivery company. The plots between HomeChoice and KIT are, apart from the peaks, quite similar. The HomeChoice service did start at a higher level, approximately 84 daily users, compared to about 51, and relates to a peak enjoyed by the service at inception (25 January). By mid February the gap between services narrowed and both were recording

Figure 3 Daily plot of NHS Direct Digital users broken down by delivery organisation

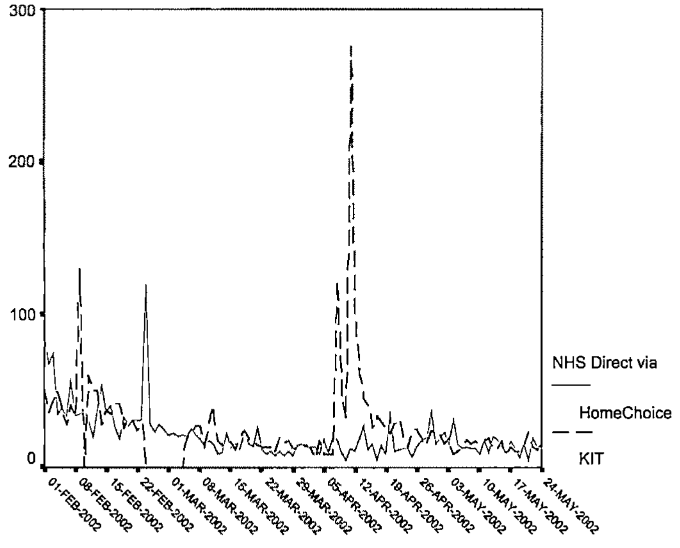


Figure 4 User activity over day of week by week – HomeChoice

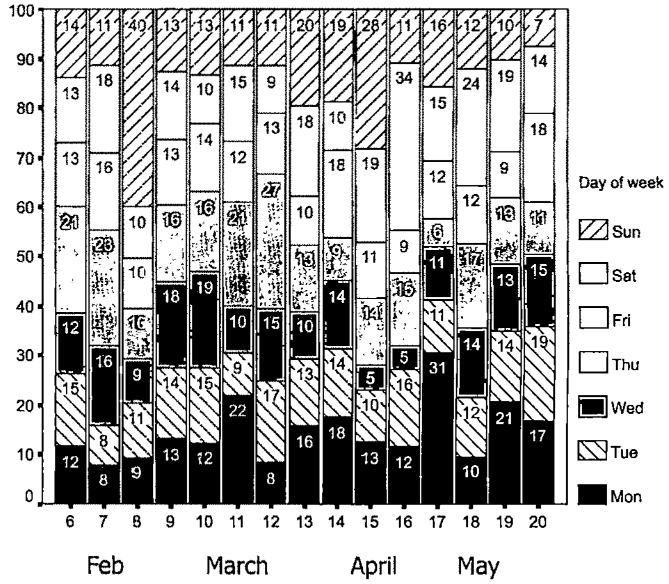
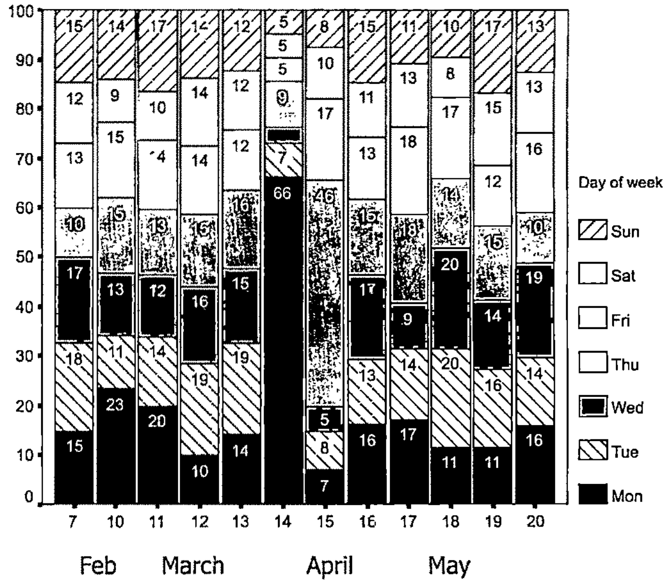


Figure 5 User activity over day of week by week – KIT



numbers within a band of 45 to 55 daily users. There was a decline in user numbers over the period. The number of users by the end of the survey period was just ten to 20 users per day. A regression over the period showed that the KIT service was losing about one-fourth of a user per day, while HomeChoice was losing on average about one-fifth of a user a day. However, the decline stopped towards the end of the survey period and this suggests that long term use would stabilise at about ten to 17 daily users for HomeChoice and about 14 to 18 daily users for KIT.

There are some "outside" factors that explain some of the figures. Thus there was a loss of service to KIT subscribers between the 25 February to the 5 March. Further, there was a peak of user activity viewing the service via KIT on the 8, 11 and 12 April resulting from a mail out of a questionnaire that was sent to all KIT subscribers. The mail out included a letter reminding subscribers how to use and find the service – they were plainly reminded, and this shows how important publicity is for innovative and unusual services like NHS Direct.

Figures 4 and 5 look at user activity by day of week over each week of operation. Use on Saturdays and Sundays regularly made up between 25-30 per cent of user activity.

The repeat user

An alternative way of looking at user activity – and perhaps a more powerful way – is to examine whether the service attracts return trade. Coming back to a service constitutes conscious and directed use – as good an approximation of this as is possible from the logs. People might arrive at an Internet site or TV channel by accident – and, of course, that constitutes "use" according to the logs, but they are unlikely to arrive at the same service again by accident. Table I looks at the frequency with which people return to each service over the four months. HomeChoice had 418 repeat users and KIT a total of 523. KIT had about 25 per cent more repeat usage. This is significant and argues that HomeChoice had the greater number of users who visited once and did not return.

Those who returned did so on average once every six to seven weeks. The average number

Table I User visits and return visits within period

	HomeChoice		KIT	
	n	%	*n*	%
Once	1,176	73.8	1,058	66.9
2 to 5	385	24.2	451	28.5
6 to 15	31	1.9	64	4.0
Over 15	2	0.1	8	0.5
	1,594		1,581	

of days between visits of those returning to the HomeChoice service was 41 days and 43 days for KIT returnees.

Figures 6 and 7 provide returnee information for each month and classify users as either new users or users returning from previous months. The figures compare new and returnee users from month to month only – return visits within a month are not included.

Figure 6 New users and returnees between months – HomeChoice users (absolute figures)

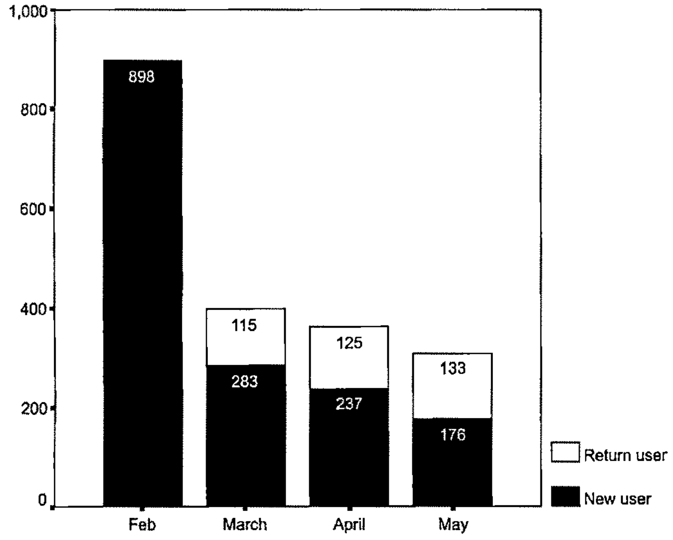
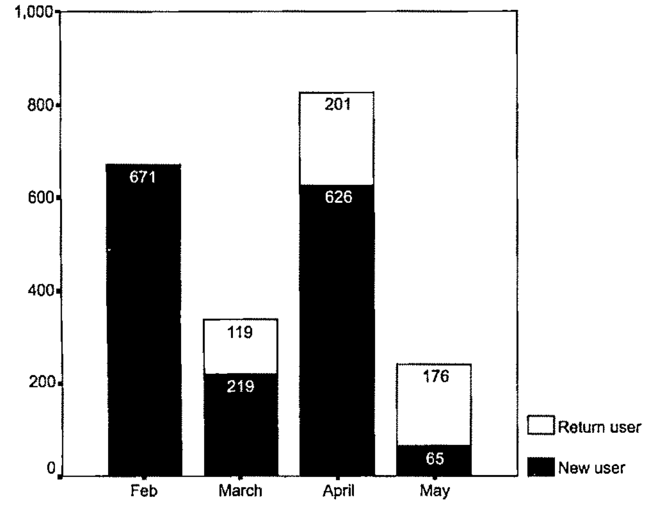


Figure 7 New users and returnees between months – KIT users (absolute figures)



New users attracted to NHS Direct via HomeChoice fell over the period. The number of new users fell by 38 per cent from March to May (Figure 6). This was not true of return visitors. The number of return visitors increased month on month and increased by approximately 16 per cent between March and May.

NHS Direct via KIT (Figure 7) attracted a dramatic increase in new users in April compared to March: a little under three times as many – 626 compared to 219. This resulted from the mail out of a questionnaire to all KIT users in April that included a letter promoting access to the service and, significantly, how to access the service. It had an impact in attracting new users to the service. However, the figure of new users recorded in May is poor compared to both the April figure (ten times fewer) and March (three times fewer) new user figures. Return users also increased in April as a result of the mail out compared to March, but not by as much as the increase recorded for new users – about a 68 per cent increase in return visitors. Return visitors in May, though higher than the March figure by half as much again, were down on the April figure. Clearly the mail out had an impact on site use, though the benefits of the promotion in attracting new users and importantly greater return usage may well be short lived.

Use

While activity in terms of numbers of users was much the same for the two services, the same cannot be said about use. Table II compares both use and user numbers. The amount of use made of NHS Direct Digital videos delivered via KIT is about half that for HomeChoice. So on this count HomeChoice scores most highly.

Figures 8 and 9 provide a visual of the daily and weekly distribution of use. As can be seen, use of the NHS service via HomeChoice exceeds that of the service delivered by KIT for all weeks, except for the week when the questionnaire was sent to all KIT users. Furthermore, the decline in use in both services for February, March and May is surprisingly similar, though there is not a sufficiently long series to say that the decline is the same.

Figures 10 and 11 look at all transaction use by hour of day and day of week. It is of interest to note that the KIT service does not

Table II Use and user activity for NHS Direct Digital

		HomeChoice		KIT	
		Use	Users	Use	Users
Month	Week	*n*	*n*	*n*	*n*
February	5	1786	262	529	181
	6	1,487	266	961	330
	7	1,016	231	794	286
	8	1,539	301	397	144
	9	875	160	N/A	N/A
March	10	838	130	551	176
	11	485	105	346	121
	12	576	96	290	102
	13	361	82	292	107
April	14	511	102	597	186
	15	506	96	2,088	605
	16	492	103	634	198
	17	607	121	401	140
May	18	666	135	336	114
	19	480	97	344	114
	20	546	95	233	88
	21	389	51	156	64

Figure 8 Daily plot of NHS Direct Digital uses broken down by host service

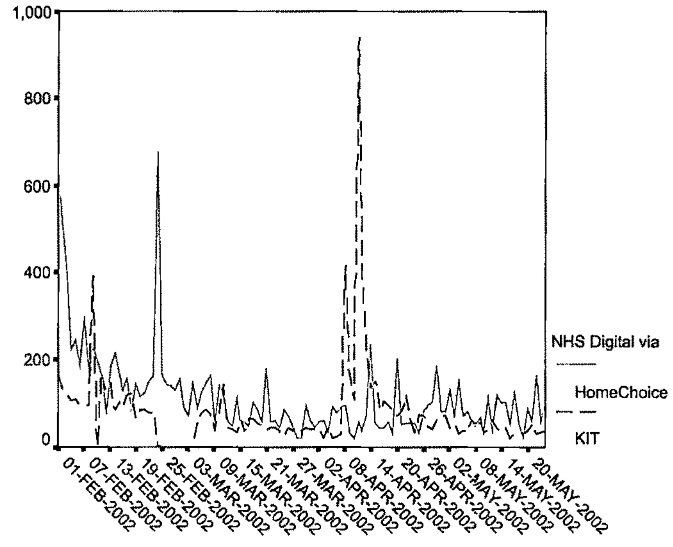


Figure 9 Weekly plot of NHS Direct Digital uses broken down by host services

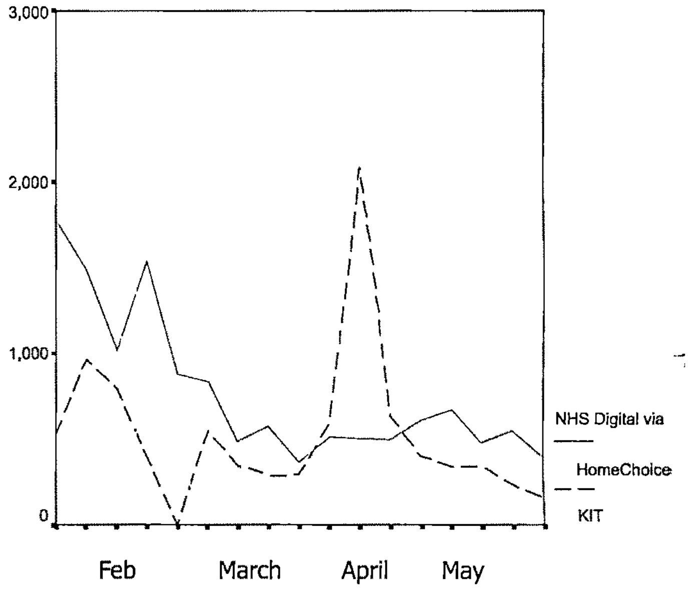
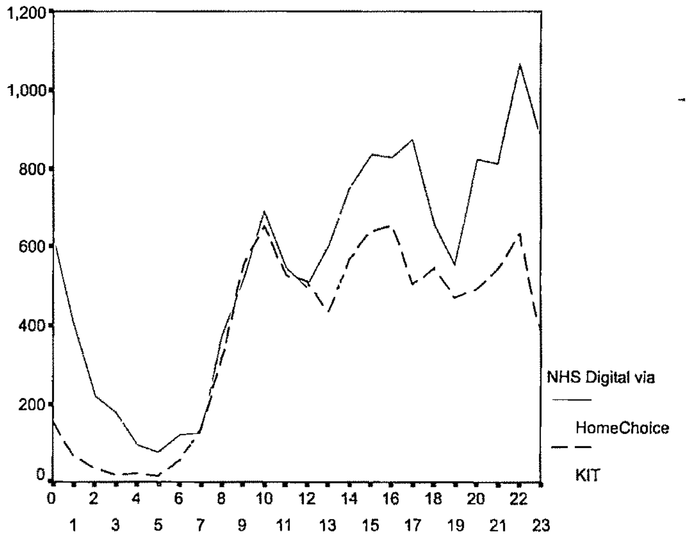


Figure 10 Use by hour of day

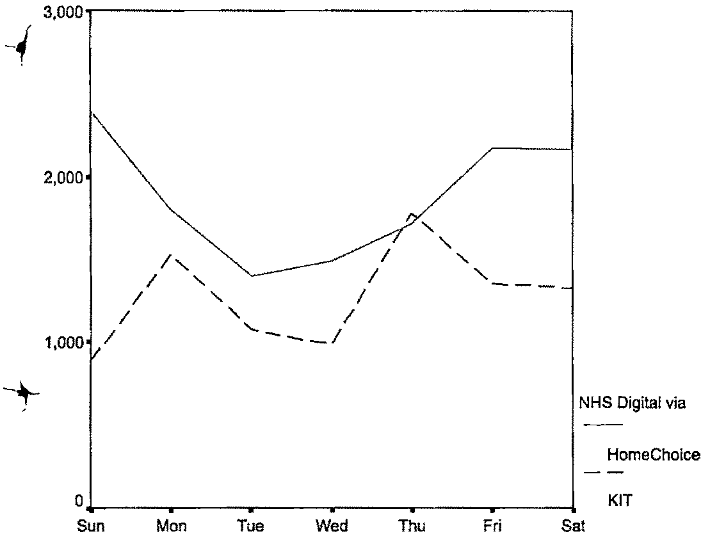


increase in use through the day in the same way as for HomeChoice. This might be an indication of capacity problems with the KIT service, although we do not have any evidence to support this claim. The increase in use of the service via HomeChoice during the late evening and early morning hours reflects the fact that HomeChoice has a younger subscriber list compared to KIT.

Looking behind the numbers

Both services made available the same selection of NHS videos. However, the services were very different in terms of menu structure and the number of information text pages made available. Though both services offered text pages the number of text pages offered by KIT was considerably more extensive. KIT offered approximately 9,000 text pages covering a wide range of medical conditions. Furthermore, KIT used a menu structure that incorporated videos that the user had to view before they could interact with the service. Users had to view an introductory menu video the first time they engaged with the system in a day, and a further video on entering each of the six sections of the service. These videos were not viewed if the user re-entered the service on

Figure 11 Use by day of week



the same day. Table III gives a breakdown between text, video and menu components of each service for the four-month period February to May.

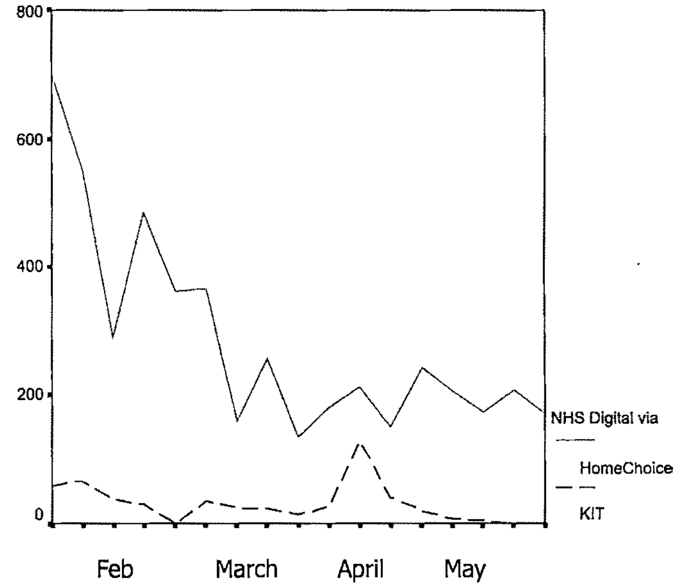
Approximately 27 per cent of the use of the KIT service was accounted for by text pages; however, this was true for only 9 per cent of use of NHS Direct via HomeChoice and reflects the reduced text service of HomeChoice. Most use, over two-thirds of use on KIT and over half of use on HomeChoice, relates to accesses to menu objects (including introductory videos). In terms of NHS videos, 37 per cent of use on the HomeChoice and 0.5 per cent use on the KIT service related to the download of information videos. The less than 1 per cent use related to videos on KIT surely represents a failure of this part of the service. Plainly NHS videos on KIT have not attracted much use.

Figure 12 plots the weekly use of NHS videos on KIT and on HomeChoice over the four-month period February to May. There has been little or poor use made of NHS videos on the KIT service compared to use of the same selection of videos on HomeChoice.

Table III Breakdown of menu, text and video use of NHS Direct Digital service

	HomeChoice *n*	KIT *n*
Menu object (including introductory videos)	7,131	84,070
Video view	4,857	511
Text pages	1,172	30,953
Total	13,160	115,534

Figure 12 Weekly use of NHS videos on KIT and HomeChoice



The number of videos viewed on HomeChoice was about 200 videos per week, however only about ten videos per week were downloaded via the Kit service. A dramatic difference by any account.

Topic videos

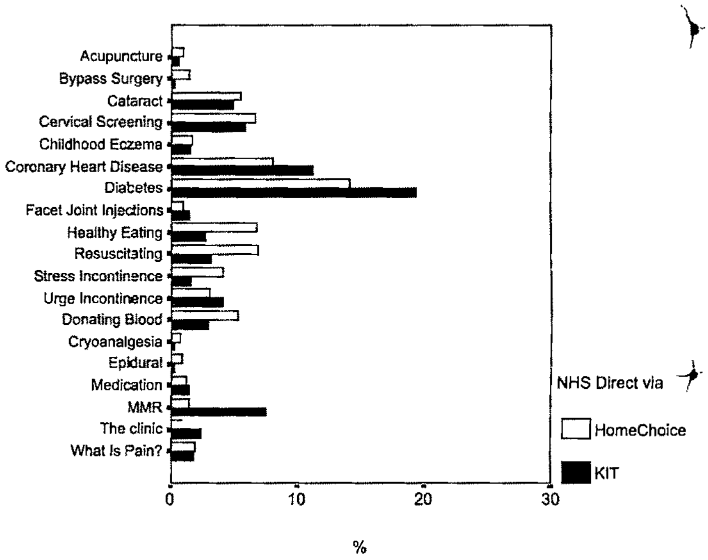
Table IV lists the videos viewed by topic for each service. The most popular topic videos watched for both services were "Diabetes" followed by "Coronary Heart Disease". However, for each topic HomeChoice users downloaded about seven times more videos compared to KIT users. For example, for diabetes videos HomeChoice users downloaded 686 videos over the period, while KIT users downloaded only 99 diabetes related videos. For no video topic were KIT users in the majority.

In general there is quite a variance in the take up of videos. However, we would not expect the take up of the video services to be the same across health topic or across type of user in focus groups[3] it was found that respondents thought that some material would be better presented in text form. This was principally in regard with the sections in the pain management and coronary heart disease programmes. In both cases there was a strong feeling that the information on medication would have been better presented in text, as a list or, more popularly, in tabular form. This view may represent an indication of the type of information people would prefer in text form. It seems to indicate that this is where the information is a series of simple

Table IV Use by video topic – February to May 2002

Video topic	HomeChoice *n*	KIT *n*	Total *n*
Acupuncture	47	3	50
Bypass surgery	66	1	67
Cataract	267	25	292
Cervical screening	326	30	356
Childhood eczema	78	8	86
Coronary heart disease	392	57	449
Diabetes	686	99	785
Facet joint injections	47	7	54
Healthy eating	328	14	342
Resuscitating	335	16	351
Stress incontinence	199	8	207
Stress and relaxation	143		143
Ulcerative colitis	120		120
Urge incontinence	149	21	170
Choking	127		127
Foray for health	224	77	301
Donating blood	255	15	270
Cryoanalgesia	35	1	36
Epidural	42	1	43
Medication	59	7	66
MMR	69	38	107
MMR	69	38	107
Tens	56		56
Tens	56		56
The clinic	41	12	53
The clinic	41	12	53
What is pain	91	9	100
What is pain	91	9	100
Hypertension	N/A	35	35
Hypertension	N/A	35	35
The road to health – Brighton	N/A	13	13
The road to health – Brighton	N/A	13	13

Figure 13 Percentage share of use by video topic – February to May 2002



facts (i.e. for taking medication, how it helps, and what the side effects are), for consultative purposes (unlike, say, patient experiences), and information requiring repeat access.

Note for many of the topics there was a series of videos available. For example, there were nine videos available under diabetes and eight videos available under coronary heart disease. For topics where only one video on the topic was available, the MMR video (downloaded 69 times by HomeChoice users and 38 times by KIT users) proved the most popular.

Figure 13 gives the percentage share of use by video topic broken down by service. KIT in relative terms, though not in absolute numbers, was successful in attracting views to videos on MMR, diabetes and coronary heart disease; while HomeChoice was successful in attracting use of views to blood donating, healthy eating and resuscitating. The main menu of HomeChoice included blood donating as a separate item and prominent digital visibility of this service on the main menu is believed to have encouraged a greater use of this video. The video was viewed 17 times by HomeChoice subscribers for each single view by a KIT user. Compare this to MMR which was relatively well used by KIT users, there was only about two views to this video by HomeChoice users for every one view by KIT users. The MMR video was the only video available under the KIT vaccination menu and this may have impacted on use.

Table V ranks video titles (ungrouped by topic) by usage. The top ranked 20 videos accounted for 47 per cent for all HomeChoice videos used and 67 per cent of KIT videos used. The reduced percentage recorded for HomeChoice suggests a wider use of video titles for this service. Videos that are highlighted bold are unique to the top 20 of that service and do not appear in the top 20 of the other service.

Comparing the unique videos of each service it seems that many on the HomeChoice service are videos giving background information, for example on what are cataracts, what is stress incontinence, what is urge incontinence, and what is coronary heart disease? These videos do not appear in the KIT top 20 and perhaps users are using the text service on KIT to get an introduction to the service and hence feel that they do not need to repeat this information by seeing the video. HomeChoice users do not

Table V Ranked top 20 videos viewed on each service

HomeChoice		KIT	
Top 20 video viewed (ranked)	**%**	**Top 20 video viewed (ranked)**	**%**
Healthy eating	6.8	MMR – what parents want to know	7.4
Blood donating	5.3	Hypertension	6.8
Resuscitating an adult	3.7	Type 2 diabetes	5.5
What is diabetes?	3.3	Getting going 1	4.7
Resuscitating a baby	3.2	What is diabetes?	4.3
What are cataracts?	2.6	Prevention	4.1
What is stress incontinence?	2.5	Healthy eating	3.5
Cervical screening	2.0	Donating blood	2.9
What is urge incontinence?	2.0	Treatments for type 1	2.9
What is pain?	1.9	Resuscitating an adult	2.7
Type 1 diabetes	1.6	Type 1 diabetes	2.5
Healthy eating for diabetics	1.6	Patient experience	2.5
Type 2 diabetes	1.6	Prostate cancer	2.5
What is coronary heart disease?	1.5	Moving on 1	2.5
Foot care for diabetics	1.5	Cooling down 1	2.3
Who is at risk of cervical cancer?	1.5	The clinic	2.3
MMR – what parents want to know	1.4	Diagnose coronary heart disease	2.2
Diabetes: patient experience	1.4	Symptoms of coronary heart disease	2.2
Exercise for older people	1.3	Screening for cervical cancer	2.0
Symptoms of coronary heart disease	1.3	Moving on 2	1.8
All top 20 as percent of total	47	All top 20 as percent of total	67

have a text explanation to these videos and are more likely to value the information of these videos or at least see it as new information.

Figures 14-17 look at the relative share of video titles within four popular topic groupings: diabetes, cervical cancer, childhood eczema and stress incontinence. There is some visual evidence that videos are more widely used by HomeChoice users compared to KIT. Certainly for diabetes there is a greater relative use for foot care, healthy eating and monitoring blood sugar levels. And use of the two childhood eczema videos is more evenly distributed for HomeChoice users compared to KIT users. However, the percentage distribution over videos seems much the same for use of cervical cancer videos and stress incontinence.

Figure 14 Diabetes videos watched in the series

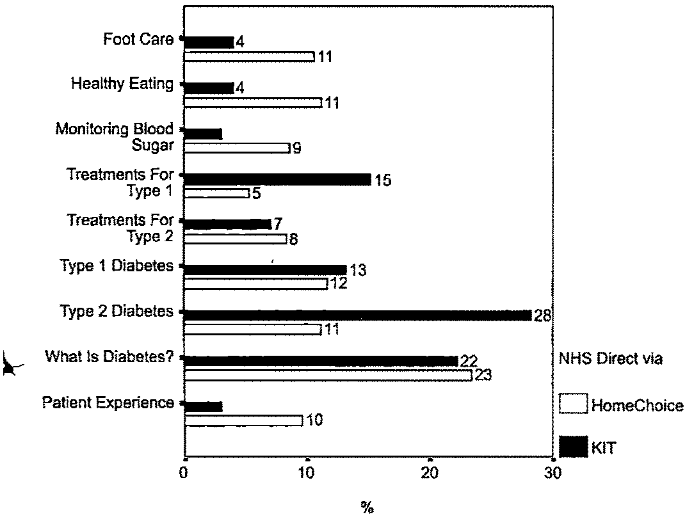
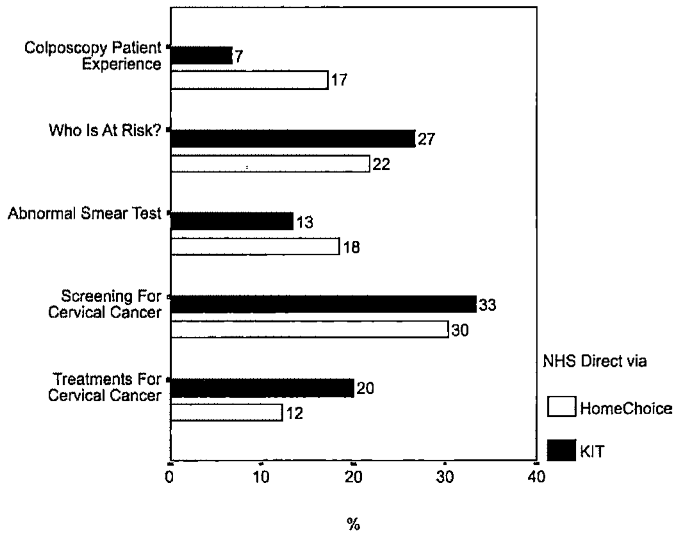


Figure 15 Cervical cancer videos watched in the series



Videos viewed

Another way of comparing the services is to look at just the number of videos viewed by

Figure 16 Childhood eczema videos watched in the series

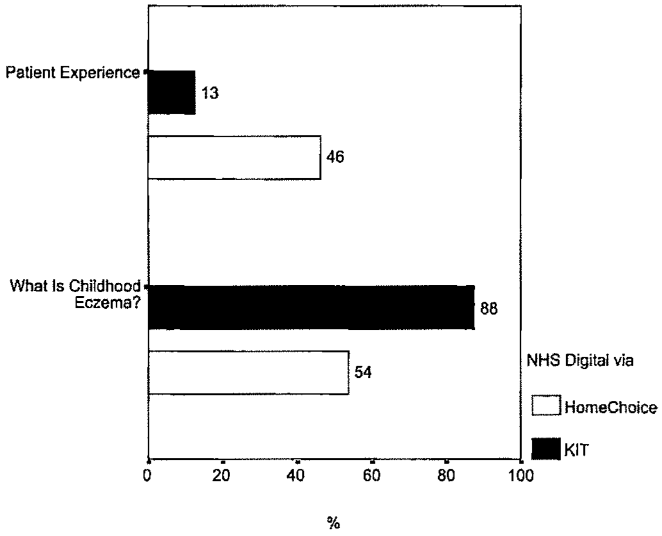
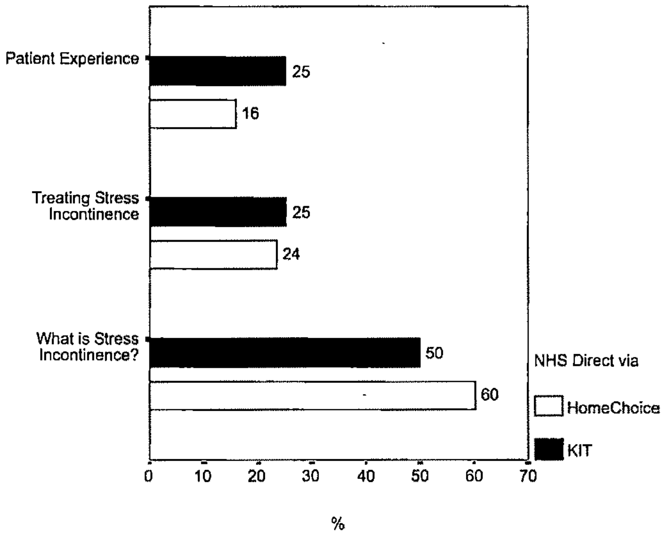


Figure 17 Stress incontinence videos watched in the series



users. Table VI gives the grouped number of videos seen by users.

Of those users who watched a NHS video, 66 per cent of KIT users and 41 per cent of HomeChoice users only watched one video. HomeChoice users were more likely to watch one or more videos compared to KIT users. This reflects a wider use of the videos by HomeChoice users.

Table VI Number of NHS videos viewed by users

	HomeChoice		KIT	
Number of videos viewed	*n*	%	*n*	%
One only	524	40.6	184	66.4
2	207	16.0	39	14.1
3	144	11.1	15	5.4
4 to 5	172	13.3	29	10.5
6 to 10	157	12.2	7	2.5
Over 11	88	6.8	3	1.1

Discussion

Plainly there was poor take up of videos on KIT and this must represent a failure of this aspect of the service. Views to NHS videos on KIT were approximately one twentieth of that compared to the same videos transmitted by HomeChoice.

The crucial point surely is that HomeChoice users did not have a choice between using either a text service or a video service – they could only view videos. This implies that the problems associated with the use of videos on KIT were that users preferred a text health information resource compared to a video information resource. Given the choice users will opt for a text health service. There is limited evidence to support this. In a questionnaire of NHS Direct (KIT) users about 60 per cent of users said that they preferred the text service, while 40 per cent preferred a video service. This indicates a preference of text over video but not a particularly strong preference. Given an equal choice between a video and text service users would take up the video service about 40 per cent of the time. However, the actual take up on KIT was considerably less than this. KIT users on average viewed 60 information text pages to one video.

Problems of video use on KIT relate to the issues of presentation when two alternative ways of receiving information are available on the same distribution service. Both a video and text service was available on the same service and the order on how each information media was presented to users is important. Here videos were available as a submenu of the text service, so that in most instances users would have already read significant amounts of text on a medical topic before they were offered a video to view. Hence, possibly, much of their information need would have already been met by the text service. The video option as an information source would not be such an attractive option as much of the information the user wanted had already been accessed. The low levels of video use on KIT does not imply that users preferred text more than videos or that the videos provided no information, it reflects the problems of presenting the same information on alternative media on the same service.

Conclusions

NHS Direct Digital was available to users in Hull and London via two very different transmission DiTV companies. Clearly the reaction by users to the same set of NHS videos has been very different. As the Wanless Report notes "Improving the use of information technology (ICT) in the health service is a key issue in improving quality and productivity" (Wanless, 2002) and the comparison here argues that there is still a lot to get right. Specifically when videos are offered with text on the same distribution service, this research indicates that poorly thought out menu structure and poor video integration with text information will result in a poor take up of the video service. The main conclusions of the research presented here are:

- The reach figure of both services was very similar – about 16 per cent.
- Use on Saturdays and Sundays regularly made up between 25-30 per cent of user activity.
- KIT attracted a dramatic increase in new users in April, which resulted from previous users and new users being attracted back to the service as a result of a one off publicity mail out.
- New users attracted to NHS Direct (HomeChoice) fell by 38 per cent from March to May. The number of return visitors increased month on month and increased by approximately 16 per cent between March and May.
- In terms of NHS videos, 37 per cent of use on the HomeChoice and 0.5 per cent use on the KIT service related to the download of information videos. The less than 1 per cent use related to videos on KIT represents a failure of this part of the KIT service.
- The number of NHS videos viewed by HomeChoice users was about 200 videos per week, however only about ten videos per week were downloaded by the KIT users.
- The most popular topic videos watched for both services were "Diabetes" followed by "Coronary Heart Disease".
- The main menu of HomeChoice included blood donating as a separate item and the greater visibility given to this is believed to have encouraged a greater use of this video. The video was viewed 17 times by HomeChoice subscribers for each single view by a KIT user.
- The low take up by KIT users of videos seems to result from text content overlap in that users would have read related text content before accessing the related video.
- Of those users who watched a NHS video, more KIT users watched just a single video: 66 per cent of KIT users compared to HomeChoice users – only 41 per cent of HomeChoice users watched one video.

Notes

1. An evaluation of pilot projects exploring the health applications of digital interactive television, Department of Health, 2001-2002.
2. Conducted by SERCO.
3. Conducted by City University.

References

Gutzman, A. (1999), *Analysing Traffic on Your E-commerce Site*, available at: www.ecommerce.internet.com/solution/techno_advisor/article/0,1281,9561-186011,00.html (accessed 17 October).

Nicholas, D. (1996), "An assessment of the online searching behaviour of practitioner end-users", *Journal of Documentation*, Vol. 52 No. 3, pp. 227-51.

Nicholas, D., Huntington, P. and Williams, P. (2001a), "Comparing Web and touch-screen transaction log files", *Journal of Medical Internet Research*, Vol. 3 No. 2, also available at: www.jmir.org/2001/2/e18/

Nicholas, D., Huntington, P. and Williams, P. (2001b), "Establishing metrics for the evaluation of touch-screen kiosks", *Journal of Information Science*, Vol. 27 No. 2, pp. 61-72.

Nicholas, D., Huntington, P., Williams, P., Lievesley, N. and Withey, R. (1999), "Developing and testing methods to determine the use of Web sites: case study newspapers", *Aslib Proceedings*, Vol. 51 No. 5, pp. 144-54.

Nicholas, D., Huntington, P., Williams, P. and Barrie Gunter, B. (2002), "Digital visibility: menu prominence and its impact on use of the NHS Direct information channel on Kingston Interactive Television", *Aslib Proceedings*, Vol. 54 No. 4, pp. 213-21.

Peters, T. (1989), "When smart people fail: an analysis of the transaction log of an online public access catalog", *Journal of Academic Librarianship*, Vol. 15 No. 5, pp. 267-73.

Stout, R. (1997), *Web Site Stats: Tracking Hits and Analysing Traffic*, 1st ed., Osborne McGraw-Hill, Berkley, CA.

Wanless, D. (Chair) (2002), *Securing our Future Health: Taking a Long-term View: Final Report*, HMGO, London, also available at: www.hm-treasury.gov.uk/Consultations_and_Legislation/wanless/consult_wanless_final.cfm?

Williams, D. (1999), *Data Plays a Key Role in Net Success*, available at: www.adage.com/interactive/articles/19990802/article3.html (accessed 17 October).

Home electronic health information for the consumer: user evaluation of a DiTV video-on-demand service

Peter Williams
David Nicholas and
Paul Huntington

The authors

Peter Williams, David Nicholas and **Paul Huntington** are all at the Centre for Information Behaviour and the Evaluation of Research (ciber), Department of Information Science, City University, London. E-mail: nicky@soi.city.ac.uk; URL: www-digitalhealth.soi.city.ac.uk/isrg/doh.htm

Keywords

Digital communications, Video, Information services, Education, Health care, User studies

Abstract

Reports on a qualitative study exploring a highly innovative digital TV pilot service. Focus groups of medical and health information professionals, "condition-specific" subjects and "general interest" volunteers were recruited to obtain views about the videos generally, in terms of their content and presentation. Issues such as terminology used and the appropriateness of using video to deliver various types of information were also explored; the latter in the light of log statistics indicating relatively low use of videos as compared to text-based services. Results indicated that those who used the services tended to be avid seekers of information, who saw the service as a first port of call to obtain general information for wider consultation later. Differences emerged between medical professionals and the lay public regarding the use of language and involvement of patients in the videos. Text was regarded as a better medium for conveying some types of information, such as simple facts that might need to be consulted on a regular basis.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings: New Information Perspectives
Volume 55 · Number 1/2 · 2003 · pp. 64-74
© MCB UP Limited
ISSN 0001-253X
DOI 10.1108/00012530310462724

Introduction

ciber's work is primarily concerned with human behaviour, as elicited by bibliometric and latterly computer log analysis. Often such studies raise important questions relating both to people's negotiation of information systems and their reasons/motivations on the one hand, and opinions regarding quality, relevance and appeal of services delivered on the other. Why are certain journals or articles cited more than others in particular fields? What motivates academic authors to switch from book to journal writing? Why do health information consumers prefer text over video images in some circumstances, or a Web site to the personal attention of a doctor in others?

Clearly, these questions can be addressed to an extent by surveying users. However, the success of ciber may depend on the extent to which it embraces multiple methods to explore the fundamental issues and questions exposed by the generation of statistical data, including those associated with the qualitative tradition more commonly associated with social science disciplines.

City University has been funded by the Department of Health to undertake a wide ranging and in-depth study of the impact of the digital delivery of health information for the consumer, which has enabled the group to deploy a range of methods to collect and analyse data and, more importantly, to integrate the array of methods used.

Systems under scrutiny for this study include touch-screen information kiosks, Web sites ("SurgeryDoor" and "NHS Direct Online"), and four digital interactive television (DiTV) initiatives. Usage, reasons for use, attitudes and opinions, and barriers to use, are all issues being explored in order to provide recommendations to the Department of Health regarding how best the public might be served information on different aspects of health in the future.

One of the DiTV initiatives, run by Kingston Interactive Television in Hull, and HomeChoice in London, is a health video-on-demand service, which forms part of "NHS Direct Digital". The research reported here is concerned specifically with this service, reached through the main menu page of their TV.

Aims and objectives

The evaluatory sessions were set up to gauge opinions about the videos generally, in terms of content, usefulness and presentation. Specific aims were to examine:

- usage, reasons for use and how usage fits with general information seeking behaviour;
- how the information obtained was utilised, and whether it helped with dealing with a health problem and/or with the doctor;
- any barriers to obtaining information from the videos, such as terminology, poor sound, distracting features etc.;
- the extent to which video is an appropriate medium for the dissemination of information, and whether some types of information might be better presented in other forms, such as text or diagrammatically.

The extent to which findings could be used to interpret log results was of major interest. Also, as several different groups were recruited to evaluate the service (in addition to the "real" users or "service user" group), it was considered appropriate to determine whether, within the sample, there were differences in opinion and perspectives between the various groups. Of particular interest were differences between health professionals and the lay public, although comparisons between health librarians, information professionals and other groups were also sought.

Methodology and sample

Recruitment and sample

A number of different groups were recruited to view the videos and undertake the evaluation. These were:

- *Service users*. An online questionnaire, activated when subscribers accessed the service, asked for interviewee volunteers. A total of 12 people offered their contact details, but eventually only five were willing to participate in the evaluation. The real user group consisted of three males and two females, aged between 25 and 60.
- *Elderly people*. A group of eight elderly people (four men, four women) were recruited from the voluntary organisation Third Age (Third Age Project, 2001). No attempt was made to obtain people with particular demographic or other characteristics. Their ages ranged from 70 to 95, and they viewed a video (on chronic heart disease (CHD)) in a group at the offices of Third Age.
- *Diabetics*. Three diabetics were recruited, the first being a friend of one of the students at City University and the others by "snowballing" (i.e. a friend of the first interviewee and then a contact of the second). All evaluators were females, between the ages of 20 and 30, and had been diagnosed at least two years before they saw the programme. It was not possible for these people to see the videos together and so individual sessions were held with two at City University. The third took the video home and was interviewed about her evaluation later, at her place of work.
- *Health professionals*. These were recruited from City University School of Nursing and Midwifery, and consisted of two lecturers (one senior) in health and health policy who had been nurses, one nurse working at Whittington Hospital, and four student nurses. The lecturers and nurse saw the videos individually; two of the students saw them in a wider group (consisting of those with a general interest, described below) and the other had an individual viewing session with the researcher.
- *Health information professionals*. Three health information professionals and one Master's degree student working in a health environment were recruited, again by "snowballing".
- *General interest (i.e. "lay") volunteers*. These were people who had no professional interest in health, nor a particular condition covered by any of the videos. They were, rather, simply interested individuals, 12 in total, recruited via the other interviewees listed above. Of these, six were City students, one an ex-student, the others being their friends or colleagues. Included in the total are three friends of the researcher. In all, five watched the videos individually at home, reporting back later, the others with members of the other groups at City University.

Methodology

A semi-structured interview approach was adopted. For the service users this was looser than for other groups, as there might have been issues in their usage which had not been considered by the researchers when drawing up the interview schedule. As they were interviewed about videos they had viewed in the normal course of their use of the Video Networks service, the evaluation was retrospective, and included details of the accessibility of the system, in terms of menu hierarchies etc. With regard to those participants who viewed the videos specifically for the evaluation, the programmes were copied onto standard videotape and shown on analogue televisions. The service users were interviewed individually. Where possible representatives from each group watched the programmes together, at City University, and discussed them in an open forum. Time constraints and availability problems meant that some evaluators viewed the videos individually, with the researcher. In two cases (one of the diabetics, and a health professional) videos were taken for home viewing, with the researcher interviewing the evaluators later, also individually.

Before the showings (and lending), participants were told a little about the research project and about the DiTV service from which the videos had been taken. (The actual service users had, of course, already seen the videos beforehand, for their own benefit.) An outline was given of the issues to be discussed after the showing. An evaluation form had been drawn up to reflect the aims of the exercise, and this was referred to but not looked at in detail until the viewers had watch the first section of the video chosen. This was so that they would have an idea of content and presentation etc. before needing to consider these and other aspects in detail, as outlined on the form. In every case, even where the researcher was present at the showing and had the opportunity to discuss the programme "live", volunteers completed the evaluation form (one for every video viewed). This both provided a structure for the discussion and a written record of views.

The service user group was in a position to provide information on all the following topics, which were not appropriate to those viewing the programmes especially for the evaluation:

- *Reasons*: for turning to the service.
- *Context of use*: how use of the service related to wider health information seeking behaviour.
- *Relevance*: the relevance and usefulness of the information regarding the particular circumstances for which it was sought.
- *Uses*: how the information was used, and any benefits that accrued (such as being better equipped to cope with a medical problem or deal with a medical professional.
- *Usability of the service*: the ease with which the videos were accessed from the menu hierarchy.

The areas discussed by all participants (i.e. the service users and the other groups) were:

- *Information content*: the comprehensiveness and appeal of the information and, in its broader sense, its potential relevance.
- *Presentation*: order of scenes, production, performance of doctors/lay participants.
- *Language and terminology*: medical language, descriptions of procedures etc.
- *Format*: appropriateness of the topic for the medium, and whether any of the content could have been better presented in alternative forms.

Evaluators could raise any points not covered above, either in person or on the evaluation form.

The videos

The service users, of course, had seen any one or more of the videos, and were asked for their views and reactions to the ones they had seen. For the other groups, a selection was chosen for viewing that reflected the range available and type available. After viewing the majority of the videos, it was possible to informally classify them to the extent necessary to choose a representative sample for evaluation. The categories, with the videos subsequently chosen, were:

- Specific conditions (CHD, diabetes).
- General condition management (pain management).
- Procedural information (giving blood).
- Practical information/demonstrations for specific demographic groups (exercise for older people).

The videos with predominantly medical content (*CHD*, *Diabetes* and *Pain*

Management) had a similar production style. A GP or similar expert spoke to camera or, at times, voiced over a specific scene (such as a consultation). The videos were broken down into standard sections (accessible individually), such as "Symptoms" "Medication", and "Patient experiences". The latter consists of individual patients describing their experiences to camera. The *Giving Blood* programme is very different. It is not split into sections and also, unlike the medical conditions programmes, it follows a person through a procedure – it is chronological, and it places the patient as the central focus. Finally, the *Exercise for the Elderly* video (and others, such as *First Aid*) consists of demonstration activities.

Results

Usage issues

Only the service user group were asked about issues related to usage, as those of other groups viewed the videos especially for the evaluation.

Videos watched and reasons for viewing

As the service being evaluated was available for only three months, it is perhaps not surprising that general curiosity about the service and a general interest in a particular topic were the principal reasons given for watching the videos rather than for a specific medical need that may have arisen whilst the service was operational. One described her viewing as being of "a clip here and there" to get a general flavour of the service and for future reference. Others also found any topic that they had a general interest in (such as healthy eating) and viewed out of general curiosity. One person did watch a video based on her condition, choosing the osteoporosis and diabetes programmes, both because she is a sufferer. Interestingly, another respondent also looked for particular topics based on a current health need – sleeping disorders and restless leg syndrome – but ended up watching a video on first aid instead, as there was no material on those topics. She has two teenage children, and felt that knowing first aid might prove useful in the future. The other service users also confirmed that they would watch any of the videos if an information need arose which was covered in the series.

These results reflect log findings, but only tentatively. These show that videos on "major" conditions were consulted more (the most viewed being *Diabetes*, *CHD* and *Foray for Health* – a general healthy living video). Topics that may affect fewer people, such as childhood eczema and cryoanalgesia were not widely consulted. However, the video on "stress and relaxation", which might be considered to be of wide general appeal, did not attract a single viewer. A general point is that, clearly, the extent of viewing out of "general interest" and, by contrast, as an aid to manage a particular condition requires further research, possibly using survey methods.

Integration of video service with other information sources

For this small sample it appears that, as with qualitative research for other strands of the same research programme, users of the DiTV service were also big users of other sources – particularly the Internet (Nicholas *et al.*, 2003). Interestingly, this is not borne out by quantitative results, which appear to indicate that DiTV reaches audiences who are not users of other information systems (Nicholas *et al.*, 2002) and so may be attributable to heavy information users being more disposed to discuss their information seeking habits. Four of the five were Internet users (which, for one, meant booking a terminal in his local library) and searched for health information from this source. Indeed, the respondent with restless leg syndrome claimed to have researched her condition on the Internet and presented her findings to her doctor, telling him "this is me". She added:

> If I didn't have access to the Internet, then I would never find out about my true condition".

As with other respondents, she said she "like[s] information in general" and has "lots of reference books and lots of alternative medicine books that I tried to go to first.

The non-Internet user was nevertheless an avid information user. She said she consulted books first, "because I am such a techno-phobia [sic]". She added:

> ... if the TV could offer me information adequately, then I would go for the TV first, whether it's in text or video form because it's so familiar to me and my kids to use the remote control. I am beginning to learn that I don't have to carry books around to get information.

The Internet users also saw the TV generally as a good source of information for health topics.

The DiTV service, as often with the Internet, appears to be principally the first port of call. Indeed, the service has supplanted the Web as the initial point of enquiry for some people:

> I have only browsed the HomeChoice service, but feel it would fit in very well with my Internet use. In fact, if the topic I was interested in were on the DiTV service I would check that out before logging on to my Internet account.

And:

> I would look it up first, see if it has something that I am looking for and watch it. Then I will probably look it up on the net further for some more info or even different opinions on the same topic.

In its role as the first point of contact the DiTV service:

> ... triggers off my interest. It makes me want to go and read about it elsewhere. ... it means I can go to the library or on the Internet and I can elaborate on it even more;

Similarly:

> I access it initially for first hand information and then I can go on from there ... it feels a lot easier in the comfort of your own home to watch some video than trying to search some written text about certain health issues ... [it gives] me further contact points as to where to go and what to do next.

A major question for the overall project is to examine the extent to which information seeking in a health context is undertaken on behalf of other people. Possibly due to the brevity of service availability and relatively limited range of videos available, none of the respondents needed to use the videos as an information source on behalf of their family. However, much researching for information in the health field was said to be undertaken for others. One respondent undertakes a substantial amount of voluntary work which involves trying to understand different illnesses and conditions, and uses books, NHS Direct phone line and various Internet sites to find answers to questions; and other interviewees gave various stories of family problems. There was also praise for video-on-demand services for their potential to reach people who might be too embarrassed to seek information from others:

> It will be very good for them to find out about recreational drugs, also it will be useful accessing information which they might find embarrassing to ask for in general like sexually transmitted diseases, HIV and AIDS, contraception, issues most young people would like to know.

Use of the information

For most interviewees, the principal use of the service was to provide background information to explore in greater detail elsewhere, as outlined above. It was mentioned that the information to be found on the video service could be used as a substitute for seeing the doctor:

> I got some idea about my condition through the video. You can't discuss with your doctors as to all the ins and outs about the condition, it prompts me then to get onto the Internet and found more information about it, like the osteoporosis society's detail and I got in touch with them.

There was also some indication that the service could be useful in viewers' dealings with the doctor. One respondent claimed to always prepare a list of questions to ask during a consultation, derived from personal research, and said the video-on-demand service would be most useful here. Another confirmed that:

> ... it just gives you more confidence in asking for the right thing. It helps in getting what you need really ... It gives you the knowledge in asking what you really need.

A third felt that it was difficult to obtain enough information from doctors because they did not have time to go into details, and that starting from a position of some knowledge would obviously be beneficial in a situation of tight time constraints:

> If I understand my condition better, the doctor can spend more time with me on how to treat my condition better.

An alternative view was that "doctors don't like it when you know a little about it. They like it even less when you know a lot". Despite this apparent antagonism it was still worth acquiring information as, "in the end they give in and listen to you". A different aspect of dealing with medical professionals was outlined by one respondent who watched the video about NHS Direct Helpline and then promptly used it to call about an infection suffered by her son:

> I had heard about it [the NHS Direct telephone line] but the programme explained it so I knew what to expect.

He confirmed that he would not have used the telephone service without this prior knowledge.

The extent to which the video programmes may affect health related behaviour is difficult to determine. One interviewee claimed that the videos on healthy eating and healthy living generally had stimulated her into buying more fresh fruit and vegetables. However, the fact that these were the topics she chose to watch indicates an interest in the topic and possibly a predisposition towards improving her diet anyway. It is, of course, possible that a desire is only fulfilled with a particular stimulant such as the depiction of healthy foods or a good workout, but actually determining a causal relationship is fraught with difficulties. Suffice here to say that self-report data from a small sample interviewed in-depth appears to suggest that under certain circumstances, a television programme may influence health related behaviour.

Usability of the service

The final area only appropriate to the service user group was that of the usability of the service. Other participants could not comment on this as they viewed the videos on an analogue TV via a standard video-recorder and did not have to negotiate a menu structure or use a remote control. Service users, on the other hand, had been exposed to the full system, and they were asked how easy they found it to access and use. No problems were reported with the navigation of the system, variously described as "simple", "easy" and "straightforward". As mentioned above, the service was accessed through the "LeisureChoice" option on the main menu, with NHS Direct being the required option from the sub-menu, which also contained "Films", "News", and "Sport". Thus, activating only one menu level was enough to arrive at the main page of the health information material. The only issue raised was that some people might not equate "Leisure" (as in "LeisureChoice") with health information. One respondent felt that NHS Direct was important enough to actually be one of the main menu items, and another felt that "LeisureChoice" should have been re-labelled "Lifestyle and health".

The facilities to pause, fast forward, stop and play again at leisure were very well received indeed: "because I work from home, if the phone rings, I can just pause it and continue later. I skip forward a lot, if I know certain parts, I often do that, which is a great feature of the service".

Having the videos split into small subsections was also favourably received, as it was said to help people to target information without viewing extraneous material. This aspect was exposed to all participants. Only the health professionals questioned it, with two evaluators indicating that watching the programmes in "any order" might be confusing for viewers, and make it harder to assimilate information.

All participants were able to comment on the following aspects of the service: information content, presentation, language and terminology, and format. Results are outlined in the sections below.

Information content

The service users were generally positive in their appraisal of the video content. The respondent who browsed through several declared that "generally they were very informative, not patronising and would be useful to go back to", and another said of the diabetics video, that "the information was good – what I would want to know". The osteoporosis video viewer said that it "made me aware of what I had, the reason that I had it, and what the prognosis is like and how to slow down the progression of the disease". Although one interviewee complained that the programme, at 15 minutes, required quite a bit of concentration (in fact, none of the individual clips last more than five minutes), other interviewees felt that, in fact, there was not enough information included. One respondent even suggested an option to access more clips treating the same topic but in greater depth:

> For example, it could have a couple of more clips on the latest research on the subject which it is talking about and new scientific discoveries or something similar, or maybe even some controversies involved in researching the subject concerned.

The groups viewing the videos for evaluative purposes only were also generally positive about programme content. The general interest evaluators said that the information was generally "comprehensive", for both the *Diabetes* and *CHD* videos. However, the medical and information professionals felt that these videos "tried to cover too much ground too quickly". There was "too much to take in", and many topics were "poorly explained". One of the medical professionals felt that the subject matter was "difficult", and the conditions, particularly CHD, "complex". The differences in opinions about the videos between medical professionals and other evaluators is interesting, and is explored in detail in the discussion section later in this report.

The elderly group saw only the video on CHD. Their views are valuable, partly because they saw the programme without members of any other group being present, partly because there were more of them to provide input (eight), but mainly because they are a group targeted by the Department of Health as requiring (digital) health information. The Wanless Report (Wanless, 2002) makes much of the fact that the population is ageing, and that the high number of elderly people in the future will place a strain on the NHS that could be reduced by higher engagement with and responsibility for their own health. The group was very impressed with the content of the CHD video, describing it as "marvellous", "really informative" and "a good thing to help people with the condition". They accepted that they were a group that needed information on coronary problems.

It is worth discussing the video on diabetes in some detail, as it was possible to recruit for the evaluation those who actually had the condition, providing the perspective of those at the front line and for whom the information was written and health professionals with an intimate knowledge of the condition. There were, in fact, interesting contrasts between the views of these two groups. The former were far more positive. The diabetics felt that the content, as one put it, "was all very relevant and covered the most important points". The other diabetics also indicated they were happy with the content. The general viewers and information professionals also considered the content "relevant", "comprehensive" and "interesting". One of the medical professionals (a nurse), however, suggested that much of the material was not very clear and that some of it was too detailed. Another said there was, at 22 minutes, too much content. There were, from other quarters – the diabetics and an information professional – suggestions for the inclusion of additional material. One pointed out that the "important topic" of genetic inheritance was not covered. Another considered that it would have been helpful to have had a section on how a newly diagnosed patient should expect to be treated by the health service, in terms of engagement with surgeries, clinics etc. and the roles that might be expected of GPs, nurses and others. Finally, one of the diabetics argued that there should be something included about the psychology and mental/psychiatric implications of being diagnosed with the condition, or "at least" the social implications and how to deal with them. There were also questions that the content raised and appeared not to answer. These included why diabetes causes eye/heart/kidney damage and why fat needs to be controlled as well as sugar.

The *Giving Blood* video, made in a different style to the others of a purely medical content, was very positively regarded by all the evaluators. The content was considered "interesting" and "appropriate", with the procedure described in an easy to understand and logical order. There were, however, (almost inevitably) suggestions for additional information to be provided. This was principally with regard to the benefits a blood bank gave to a hospital in treating patients and the value, therefore, of giving blood. As these benefits were not emphasised, in the opinion of the evaluators, the video was described as appearing to aim at the "already committed". It was felt that the programme should have aimed more at recruiting donors. Highlighting the benefits one gave to others would, it was felt, encourage the activity. As a footnote to this point it may be said that as the videos are "on demand" those electing to view this particular one would already have considered the possibility of becoming a donor – just as those watching a programme on healthy eating may be already thinking about some action on their part. This is unlike the case where a broadcast programme may reach people who are watching by chance and get the idea of giving blood specifically from the programme.

Presentation

There were mixed views with regard to the presentational aspects. The presenters (i.e. doctors) were criticised as being "boring" and "uninspiring", with one viewer, a nurse, complaining "they reinforced the stereotype". When asked to expand she said they were "aloof, distant and unfeeling". Members of the elderly group felt that the doctor featured was "typical" in this respect, although others said that their own doctors were friendlier. The video was redeemed by the participation of patients (who appear in a section entitled "Patient experiences"). These were described as "genuine", "warm" and "interesting". Given this, it is perhaps surprising that no one considered that there should have been greater participation by the patients. As with the case of *Diabetes* and *Pain Management*, however, there was a general feeling that instead of "lumping together" the patients in one section, they should feature at various points. For example, when the doctor describes the symptoms, it was considered better to have had a sufferer reflecting the professionals' comments by talking of his/her own situation. In the video shown, the doctor is a voice-over in a scene showing a man holding his chest and staggering. This was regarded as "distracting" at worse, and "unhelpful" and "unconvincing" at best.

Several viewers from the service users, the general interest and health information professionals groups thought that too much attention was made of the speakers and not enough on using the video medium to look at procedures, situations etc. As one of the nurses said, "the possibilities are there, but most of the programme was a guy talking".

One point of interest regarding the production and presentation of the videos was opinions about the involvement of the general public/patients in the programmes.

The *Pain Management*, *CHD* and *Diabetes* videos all lead on health professionals, generally as "talking heads" explaining medication, processes etc. Public/patient participation is somewhat minimal, except in separate sections entitled "Patient experiences", where patients also appear as "talking heads", describing their own symptoms and treatment etc.

Evaluators considered that although there was sufficient involvement of the public in these videos the type of participation was not ideal. Nearly all evaluators, including the service users, felt that there should have been a far more dynamic involvement: "The patient is just there like a tailor's dummy". The service user who watched the programme on diabetes remarked, "that bit about diet – why didn't they show a family shopping or planning a meal, with the heart-attack guy saying something like "you've got to buy extra fruit – the doctor said it keeps the fat down".

Illustrating the appeal of having the public more engaged in the programme content was the positive view of the programme on giving blood. This video followed a potential blood donor through the blood giving process. The focus was thus on the lay member of public, with the medical professionals reacting to him, rather than the "talking head" of the doctors, with the patient a secondary figure, as in the CHD and other medically oriented videos. The medical professionals appeared as they would in the real situation (i.e. to register him, take a sample etc.). Evaluators from all groups viewing this video felt that this was an excellent approach.

Interestingly, the diabetic group did not regard the degree or type of patient involvement as an issue. They felt that the split of medics in some sections and patients in others was "well done", and were comfortable with the practice of having patients explain their condition in a separate section. One said that this did not interest her, as she knew her own experiences, and was more interested in latest developments in treatment, rather than the views of other sufferers. It might have been interesting to have shown the video to a group of newly diagnosed diabetics, who might have had a different outlook.

One other point was made with regard to the video participants. One of the health professionals described them as "all white and middle class". Apart from this lack of inclusivity, she pointed out that much diabetes occurs in the Asian and Afro-Caribbean communities. In addition to the lack of contributors from these groups, the information given in the programme did not allow for differences in diet or lifestyle, which affect the condition and its treatment. The diabetic evaluators did not mention this aspect. This is probably due to the fact that they themselves were all white. Also, it may be that the health professionals may know more about the condition than the sufferers, certainly in the field of epidemiology. The general interest viewers (one of whom was of African origin) similarly did not comment on this, possibly not knowing the ethnic bias the condition manifests.

Language and terminology

Evaluators' views on the language used in the programme were mixed, although within-group opinions tended to be similar. The health professionals, in general, considered the language to be too difficult and were somewhat critical of the language. The elderly group also felt there were many medical terms and expressions that they did not understand, but were quite accepting of this. Other viewers, including one of the health information professionals, thought the language was generally understandable, one going so far as to say that terms used were "well explained". The elderly group had an interesting view of this aspect of the programme. They claimed that despite difficult terms, the language used was not a problem. One reasoned, to general agreement, that "there is so much around today that we don't understand – we just let it go by!" Pressed on this point, others said that there were so many new developments they could not keep up with that they tried not to think about it. One said his video-recorder was the oldest and simplest available, because the instruction book for new ones was "ridiculously complicated". The video viewed (*CHD*) was beneficial, it was claimed, as it was not difficult to grasp the essential messages (in this case regarding diet, lifestyle and treatment etc.) even without a command of some of the vocabulary. Clearly, visual material is appropriate for those who have doubts about technical or medical vocabulary. Much material, however, consists of a "talking head", where it could be argued that the medium is not being exploited to its full extent. Despite assurances that the video was "interesting" and "helpful", it remains for further research to determine the amount and value of information that is actually imparted.

The diabetics felt the language was "pitched just right" with regard to the video on their condition. A nurse who had originally criticised the language later said she felt that long-term diabetics would probably be familiar with the terminology, but newly diagnosed cases and carers would not, and opined that the video would be for these people too. The terminology used in the *Giving Blood* programme was considered very understandable by all groups. Unlike with others dealing with medical (as opposed to general health) issues, there were no complaints by the medical professional viewers or others about difficult technical or medical terms. This may have been because the information was presented within a specific and demonstrated (i.e. "acted-out") context, although evaluators did not consider this possibility. Any deeper analysis would have to work through the programme transcripts, run them through a reading level programme and then compare results with those found by interviewing viewers.

Format

There was much agreement amongst evaluators of all groups with regard to whether some (or all) of the information would be better presented in another form. Particular emphasis was placed on text, but viewers were also asked about diagrams or animation. People from every group felt that the sections on medication, in which a doctor talks about various medicines and their effects, could have been better presented as a table, listing medications, functions, effects etc. It was variously suggested that this could be on screen with a voice-over giving additional details, accessible from a remote control button, whereby viewers could toggle between the video and the table, and, by contrast, as a replacement for the video section. Many people felt that, without such textual reinforcement, this section was ineffectual: "No-one could remember all those details", "You would have to be a quick writer to get all that down for when you needed it!" It was suggested by two of the health professionals that the classification of the medication (i.e. curatives, pain relievers etc.) was not explicit enough, and that a table would have been of much help here. Others (two health information professionals and a general interest viewer) felt that a written summary of every section would have been helpful. Sections on diet (in *CHD*, *Diabetes*, as well as in the *Healthy Eating* video), could, it was suggested, also benefit from recipes displayed on screen and, ideally, printable.

Evaluators' preferences for material in written form is backed by research showing this to be beneficial. Studies have shown (e.g. Kitching, 1990) that generally patients forget half the oral information provided to them within five minutes of leaving a consultation. There is no reason to suppose their ability to retain such information from the television may be any better (although in this case there is, of course, the option to replay the tape). Studies in the USA (e.g. Wehby and Brenner, 1997) have shown that patients, in this case with chronic heart failure, find it difficult to retain information and that they may not appreciate the relevance of information provided by clinicians. Therefore, written advice, particularly if printable, would seem to be a good option.

A possible preference for text services is reflected in the logs. In total, 85 per cent of users did not view a topic video, though these users made use of accompanying textual information, and 89 per cent of user sessions did not include a view of a topic video. In the paper by Huntington *et al.* (2003) in this issue, striking differences are evidenced in the extent of take-up of this service – which provides video information accompanied by text-based materials, and that of a similar service (indeed, the videos are the same) in which only the videos are offered. The video-only service had a greatly reduced reach figure (i.e. the number of people who used the service compared to the number to whom it was available).

General discussion and conclusions

A number of issues were raised in this exercise, and several important points emerged. Of particular interest was the fact that there were several instances where the general interest evaluation participants and the service users appeared to be more positive about the videos than either the health librarians or, more particularly, the health professionals. This was most marked in the videos about specific conditions (e.g. diabetes, CHD). The differences were not so marked in the case of general health videos (*Healthy Eating*) There may be several reasons for this:

- The health professionals and, to a lesser extent, health librarians, have a better awareness and knowledge of the subject and are more able to judge the accuracy and comprehensiveness of content and, thus, be more critical. A good example of this was the evaluation of the Diabetes video. One of the nurses pointed out that: "much diabetes occurs in the Asian and Afro-Caribbean communities. There were no contributors from these groups, and the information given in the programme did not allow for differences in diet or lifestyle, which affect the condition and its treatment". As mentioned above, other viewers might not have known about this important omission, and so judged the programme more positively.
- Lay viewers look at the videos more in terms of a "need to know" perspective, and may filter unnecessary information, including difficult terminology. This was particularly apparent in the case of elderly people, who admitted their ignorance of medical vocabulary but claimed to have understood the main messages from the videos: "of course, I didn't understand every word, but you don't need to – I got the gist – more than that really".
- It is possible that the medical (and information) professionals underestimate the ability of lay people to understand both medical terminology and concepts. It was always medical professionals (and some members of the elderly group) who claimed the language was too difficult.
- There may be an element of "territory marking" going on, whereby the medical professionals are seeking to hold on to their status as knowledgeable guardians of health information. The ever-widening availability of health and medical information for the "consumer" may be seen as a threat rather than a help. It might be natural for doctors and nurses to dismiss much medical information as too difficult for the lay user.
- Alternatively, it may be that those lay viewers who said that the level of language was not difficult were reluctant to admit ignorance. It is hoped later in the project to carry out tests, which would examine information reception and retention. This will provide a more accurate assessment of language and terminology than self report opinion data.

An interesting point, that may be explored in more depth in the future, is the possible differences in content, presentation and even format which people watching the videos from different perspectives might benefit from. In the diabetes programme, for example, the diabetics themselves were happy to listen to a "talking head". As people experienced in coping with the condition, they were not looking for demonstrations of procedures or depictions of fellow sufferers going about their daily lives. They wanted more in-depth information, on new medications etc. Those with a general interest, however, felt that the programme was lacking and wanted a more dynamic production. This may be because they have less at stake, as regards information acquisition, and therefore need to be entertained more. Viewers from different ethnic backgrounds may need information that is tailored to their lifestyle, diet or culture. It may even be that, if videos are to be translated, the resulting text is not simply a word-for-word copy of the original, but modified to suit particular sensibilities and issues. Clearly, having short video-clips of between five to ten minutes, on-demand facilitates customised content (indeed, this has even been undertaken to an extent – the programme on CHD includes a "Patient experiences" section repeated using sign language, and again with subtitles).

A related point is the material respondents considered better presented in text form. This was principally the sections in the *Pain Management* and *CHD* programmes. In both cases there was a strong feeling that the information on medication would have been better presented in text, as a list or, more popularly, in tabular form. This view may represent an early indication of the type of information people would prefer in text form. It seems to indicate that this is where the information is of the type requiring repeat access, such as a series of simple facts (in this case, reasons for taking the medication, how it helps, and what the side effects are).

With regard to the latter point, it is worth mentioning that there is much log evidence to show that text services are far more used than video. Despite the programmes being divided into a number of small units, it is more difficult to pinpoint a particular item or fact required from a video than from text. The former cannot be browsed or scanned in the same way – only "serial access" is possible. For this reason it might be that video is more appropriate for general background information, enabling an overview of the topic. Experiences and opinions or other "general interest" type material not required for consultative purposes might also be well presented in video form.

A very strong finding emerged regarding the participation of patients themselves. There was universal agreement that the amount of time they were allocated was sufficient, but that what was really wanted was a more dynamic positioning, where there was more interplay between patients and the health professionals. Viewers clearly wanted a heavy involvement by the professionals – the whole idea of the programmes was to provide information and advice – but they also wanted the perspective to be that of the patient. The generally unfavourable comments regarding the performances of certain of the health professionals (that they were "aloof" and "unfriendly") might have been ameliorated had there been more footage of interaction between patients and professionals. It is interesting that the sections offered in the videos in which patients (as "talking heads") appeared were not the most commonly viewed pages, as elicited by the logs of service use. This emphasises the importance of integrating this aspect of the topic with medical information, and not having it as a divorced bolt-on.

In conclusion it may be said that although the idea of informing the public about health by using the medium of video may appear attractive, there are many issues to address. Not least of these is the type of information that may be appropriate to mediate in this form. Problems of access to specific information points and the need to record information (i.e. such as that on medication) indicate that a moving image might not be the best form of representing some information. Secondly, the "talking head" approach does not appear to be the best way of exploiting the medium.

References

Huntington, P., Nicholas, D. and Williams, P. (2003), "Comparing the use of two DiTV transmission services: same health information service, different outcomes", *Aslib Proceedings*, Vol. 55 No. 1/2, pp. 52-63.

Kitching, J.B. (1990), "Patient information leaflets – the state of the art", *Journal of the Royal Society of Medicine*, Vol. 83, pp. 298-300.

Nicholas, D., Huntington, P., Williams, P. and Gunter, B. (2003), "Broadband nursing: an appraisal of pilot interactive consumer health services: case study In-vision", *Journal of Advanced Nursing*, forthcoming.

Nicholas, D., Huntington, P., Williams, P., Gunter, B. and Monopoli, M. (2002), "The characteristics of users and non-users of a digital interactive television health service: case study the Living Health Channel", *Journal of Informatics in Primary Care*, Vol. 10 No. 2, pp. 73-84.

Third Age Project (2001), *Third Age Project Review Report 1997-2001*, Third Age Project, London.

Wanless, D. (Chair) (2002), *Securing our Future Health: Taking a Long-term View: Final rReport*, HMGO, London, available at: www.hm-treasury.gov.uk/Consultations_and_Legislation/wanless/consult_wanless_final.cfm?

Wehby, D. and Brenner, P.S. (1997), "Perceived learning needs of patients with heart failure", *Heart Lung*, Vol. 28, pp. 31-40.

Modelling the diffusion of specialised knowledge

Julian Warner

The author

Julian Warner is a Lecturer at the School of Management and Economics, The Queen's University of Belfast, Belfast, Northern Ireland, UK. E-mail: j.warner@qub.ac.uk

Keywords

Dissemination, Research, Science, Diffusion, Knowledge

Abstract

This paper reviews developments from a study of the reception of the Research Assessment Exercise 1996. Research evaluation, including the value of citation analysis and the responsibilities attaching to publication of citation analyses, is considered. The distinctions made in the communication model for analysing reception, between dissemination and diffusion and between esoteric and exoteric media and communities, are developed further. Information transfer is represented as an explicable process. Possible further developments, including the appropriate relation to disciplines with related interests in the social communication of knowledge, are anticipated.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings: New Information Perspectives
Volume 55 · Number 1/2 · 2003 · pp. 75-83
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310462733

Introduction

A paper (Warner, 1997) traced the public reception of the Research Assessment Exercise 1996 (RAE) and was effectively a modern social epistemological study, focussing on social rather than primarily individual ways of knowing. The concerns of that paper with research evaluation, with formulating a communication model, with demonstrating the explicability of information transfer, and with the current possibilities for social epistemology have all been subsequently developed. These developments are considered here.

The venue (The Swan Hotel, Bedford) for the conference at which a version of this paper was delivered is associated with John Bunyan. Some of the allusions connected with the time and place of oral utterance retain relevance in written form. For instance, the paper was considered to be given in the existential interval discovered in "the midst of a game of cat", recalling Bunyan's autobiographical experience recounted in *Grace Abounding to the Chief of Sinners*:

> ... and having struck it [the cat] one blow from the hole; just as I was about to strike it the second time, a voice did suddenly dart from heaven into my soul, which said, Wilt thou leave they sins, and go to heaven? Or have thy sins, and go to hell? (Bunyan, 1987a, §.22).

The voice heard by Bunyan was real in its effect (the beginning of Bunyan's process of conversion). Analogously, the theme that perceptions are real in their consequences, traceable to sociology in the 1930s (although there are other antecedents), lends significance to the social epistemological studies which are to be described. In ordinary understandings, too, there would be agreement on the significance on the mass media, including newspapers (exoteric media in the classification to be developed here) to public perception of events and to policy formation. A puritan conscience could be detected in the focus on the individual intellectual labour of the researcher, although research also includes elements of deliberately collaborative intellectual labour, particularly dialogue with students.

A collaborative impulse is also revealed in a deliberate inheritance from structuralism.

The author would like to acknowledge the collaborative intellectual labour of the 1997 and 2001 student cohorts.

Following Levi-Strauss, the thinking subject is disregarded and the social epistemological study proceeds as if thinking was taking place in myths or texts. The concern is not with the personal author of an article but with the place of contributions within the social production and communication of knowledge. Studies produced on these assumptions may not have immediate application (contrast the proposal to substitute citation based measures for direct peer evaluation of research) but can have wide and significant implication.

Research development

The paper, "The public reception of the Research Assessment Exercise 1996" (Warner, 1997), which is the proximate origin of the themes to be discussed, was first developed informally, by the personal collection of newspaper cuttings. Research was then progressed more formally (although without specific funding) by searching newspaper and magazine databases and by analysis of retrieved material, using techniques derived from grounded research. The paper was written shortly after the communication events it studies, giving it unusual currency in academic terms.

The topic reflects a concern with the position of academics, who, as personal subjects, communicate with others who find the nature of their work remote and have illusions of its tranquillity. Two aspects to the study can be distinguished:

(1) An empirical focus (the reception of the Research Assessment Exercise 1996).
(2) A communication model (supported by information retrieval techniques).

The communication model, and the possibilities offered by information retrieval techniques and resources, are probably of greater interest, with stronger possibilities for development, than the specific empirical focus.

I will not directly review either the empirical focus or the communication model embodied in the original paper, but will consider their subsequent development and anticipate further possibilities. The diverse intellectual labour represented by the spoken contributions of the conference participants will now be incorporated into the written paper.

Empirical focus

The public reception of the RAE 1996 formed the empirical focus of Warner (1997), with the level of granularity largely stopping short of intra-disciplinary discussions. Some attention, however, was given to the literature of information science, particularly to previous contributions which had been concerned with citation analysis and the assessment of research. These contributions were mentioned antithetically, suggesting that there had been a failure to accept responsibility to inform discussions of research assessment from understandings of scholarly communication and the development of knowledge.

A collaborative approach, incorporating spoken and written interaction with science communication students, led to further developments[1]. The primary focus of student responses was not technical (although significant issues were raised) and many suggested that the approaches could be complementary rather than antithetical. Crucial points relating to research evaluation, emerging from the dialogue with students, were synthesized in Warner (2000a).

Description and value

A distinction between description and value was not necessarily fully, if at all, made in discussions of citation counts and research evaluation. By description, is understood the correlations established and by value, the use made of those correlations. For instance, should we use citation data to determine or to inform our judgment?

Although a distinction between description and value is not fully made in the studies which have proposed substituting citation measures for direct peer-based research evaluation, it emerges indirectly in an area which mediates between description and value (this could be regarded as the return of the repressed). The issue of the transformation of citation rankings into RAE grades begins at the level of description but modulates into considerations of value. At the technical or descriptive level, the correlation demonstrated by studies is between rankings for Units of Assessment (UoA) by citation counts and by Research Assessment Exercise grades, not directly between the numbers in each category (early studies obscured this distinction). At the level of value, the distinction is forcibly brought home when an attempt is made to translate from citation counts into possible research grades, possibly for the purposes of prediction, and the complexity and contrivance of the procedure is exposed.

Macro- and micro-levels of correlation can be distinguished. Macro is understood as a collectivity of institutions (which might be a UoA) and micro as the individual entity within a collectivity, such as an academic department. At the macro level a strong correlation exists between rankings derived from citation counts and from RAE grades. Correlation at the micro level is far more variable. These correlations also correspond to the level of description. Dialectical progress can be made by restoring the distinction between description and value and examining more carefully what exists at the level of description.

In other contexts, concern has been expressed at the relative lack of validating studies for citation analysis (Garfield, 1998) (there is an analogy here with debates in information retrieval system evaluation where the possible distortion of relevance judgments by their experimental contrivance, compared to real world relevance considerations, has been increasingly recognised). The RAE grades represent a historically rare instance of real world, and not experimentally elicited or contrived, judgments of research quality, which lend themselves to simple rankings. The studies can then be regarded as yielding a significant validation of the correlation between citation counts and other intersubjective methods of research evaluation, at the macro-level and at the level of description.

The distinction implied between intersubjective criteria and objective measures might seem technical but it does have significant implications. First, it enforces the recognition that citations are a product of human activity and not naturally given. Humans making citations may change their actions if the significance attached to citations is altered (as Laurie Taylor has more informally observed). Second, citation counts are no more, and no less, objective than any other collective human activity.

At the level of value, we then move from using citation data as a substitute for other methods of research evaluation to a position where it could be used to inform judgements of research quality or as a forensic technique. By restoring the distinction between description and value, and clarifying a contrast between macro- and micro- level correlations, the intellectual labour embodied in the studies demonstrating correlations is carried forward, with a potential application to more productive purposes.

Data analysis and presentation

The data relating to the public reception of the RAE was analysed. For the analysis of themes embodied in the public discussion, understandings and techniques derived from grounded research were used. Themes were identified and passages embodying themes were sorted under thematic categories. Categorisations are regarded as robust and complete when categories are relatively mutually exclusive, the overall categorisation is not too fragmented or complex, and when further data can be assimilated without change to categories (a distinction between the robustness and the analytical interest of a categorisation can be made, although it is often left implicit or assumed).

The data set (only measured after analysis) amounted to c.400,000 words but was analysed without the use of specialised software packages. Direct immersion in data is valuable for the gradual accumulation of insights it can yield (compare native language acquisition with learning a foreign language). Not using a specialised package also enforces distinctions between theory (grounded research), technique (categorisation of data), and method (sorting data into categories), which might otherwise tend to become obscured. For more extensive data sets, greater human labour in analysis would be required, possibly assisted by specialised software packages.

Results of analysis were presented verbally, in written form. For other studies, this could be supplemented by graphic presentation of dissemination over time and intellectual space. In contrast to more standard techniques, such as questionnaires and interviews, for assessing public or participant understanding of an event, data derived from public discussion can be more highly current, with less immediate human labour and associated cost. It is also less artificially elicited than interview or questionnaire responses (although the content of messages is still clearly influenced by the circumstances of their production).

The ethical responsibilities attached to the production and publication of citation data constitute a final issue relating to the empirical focus of the project. The issue emerged into awareness after the primary study and again reflects the case that conscious human subjects are both the objects and potential recipients of studies. What effect do published analyses have on research judgments? Do citation counts and research judgments remain independent variables after analyses have been published? An analogy with judicial procedures concerned with protecting jurors from bias would suggest that once studies are published they would affect judgment. What responsibilities should then attach to the publication and use of citation analyses?

The issue of publication and communication brings us on to the communication model embodied in the paper.

Communication model

A communication model was developed concurrently with the acquisition and analysis of data. The model contains two crucial distinctions, between dissemination and diffusion and between esoteric and exoteric communities and media. Both of these distinctions have intellectual antecedents, which can be partially restored here.

Dissemination and diffusion

Dissemination is understood as message transmission and diffusion as the processes of understanding following on message transmission.

A distinction between message transmission and understanding is deeply embedded in Western literate culture. For instance, it has analogues in the Platonic distinction between the sensible and the intelligible, in ordinary discourse references to form and content, and in semiotic distinctions between aspects of the sign. It can even be traced in information theory, where the communication engineer's concern with a sequence of symbols is differentiated from a concern with the semantic aspects of the message. A distinction between message transmission and understanding may not be made by primarily oral cultures (consider the proverbial association of the messenger and message).

In this context, it should be noted that a contrast between message transmission and understanding has a biblical resonance, particularly in the parable of the sower, "Some fell upon stony places." The parable distinguishes different depths and durations for diffusion and this could be a valuable discrimination. A further understanding developed is that insight can be crowded out by other concerns. An echo of the radical idea of dissemination, in the etymological sense of sowing seed, can be found in Bunyan's verse preface to *The Pilgrim's Progress*: "Then read my fancies, they will stick like burrs" (Bunyan, 1987b, p. 8).

A distinction between dissemination and diffusion seemed essential, in the context of Warner (1997) and other analogous studies. A failure to make such a distinction could lead to conceptual confusion (compare not introducing a distinction of invention from innovation in assertions about the impact of technologies (Warner, 2000b)). Diffusion is regarded as more complex than dissemination and less amenable to central control and coordination.

The crucial modern issue, debated in various disciplines, is whether a single plane of content is analytically adequate. A contrast could be made between Saussurean and Peircean semiotics, where a single signified is distinguished in the Saussurean tradition while Peirce (and Peirceans) make further analytical distinctions. For semiotics, the issue is whether the further complexity is repaid in terms of insight gained or systematicity enforced. By analogy, a single plane of diffusion might not be analytically adequate, particularly for accounting for different depths and durations, but further formalisation, as distinct from alertness to possible contrasts, might lead to rigidity.

Esoteric and exoteric

A further distinction was made between esoteric and exoteric communities and media (probably derived from an unconscious memory of structuralism). The distinction also has a theological resonance and origin, and now occurs primarily in theological discussions, but can be understood more broadly. In view of its admittedly *ad hoc* formulation, the scope, comprehensiveness, and possibility of effective recursive application of the distinction is surprising.

The distinction may be first grasped through exemplification. For instance, where information science is taken as the discipline for discussion, a series of disciplinary journals can be seen (further distinctions by communicative function could be made within these, signalled by the inclusion of a Bulletin as well as primary research journals) (Roberts, 1979). Scientometrics could be regarded as representing a sub-discipline. The distinction between esoteric and exoteric media can be applied recursively, to useful effect (see Figure 1).

The next level is of trans-disciplinary publications, which have a crucial mediating function, communicating across disciplines, from scholarly research to the wider public, and from the wider public to scholarly communities. There are only a few, relatively high circulation publications in this area, but they have crucial mediating functions. Their low number could be regarded as an instance of the self-organising nature of communication, where market forces restrain the introduction of other journals.

At the next level, we have educational supplements to national newspapers, which can be regarded as esoteric elements placed in an exoteric context, with the language and level of granularity of discussion adapted to that context and function. And, finally, we have the exoteric or wider public media themselves.

There are dangers of introversion and isolation where an esoteric community becomes detached from the exoteric sphere (and, historically, this has been regarded as an aspect of the impoverishment and decline of the esoteric, from higher knowledge to the arcane). No a priori assumption need be made concerning the relative status (truth value) of esoteric and exoteric knowledge. Impoverishment of an esoteric community may occur if that esoteric sphere is isolated from exoteric discourse and the possibility of renewal by recruitment from the exoteric sphere. Some hints of such impoverishment could be found in the recent history of information science.

The model of communication formalised here is more informally held by scientific participants in communication, revealed, for instance, in the significance attached to exoteric communication and to the journals with a mediating function (consider the prestige of publication in *Nature*, for instance). Contributors to particular debates will act upon the model informally held. In this sense, like other actors in a labour process, scientists and other scholars both produce the system of communication and are confronted by it in the appearance of objective reality.

Intellectual space

An idea of intellectual space is implicit in the model for communication. The idea of intellectual, as distinct from physical or geographic, space is partly metaphorical but so widely used that its metaphorical elements may be forgotten. In their radical or etymological senses, esoteric and exoteric

Figure 1 Esoteric and exoteric media

<table>
<tr><th>Esoteric</th><th>Exoteric:Esoteric</th><th>Exoteric:Esoteric</th><th>Exoteric (Esoteric)</th><th>Exoteric</th></tr>
<tr><td>Scientometrics</td><td>Journal of the American Society for Information Science and Technology
Journal of Information Science
Journal of Documentation</td><td rowspan="2">Times Higher
Chronicle of Higher Education
Nature
Scientific American</td><td rowspan="3">Guardian Education
Independent Education</td><td rowspan="4">Guardian
Financial Times
Independent
New York Times</td></tr>
<tr><td colspan="2">Bulletin of the American Society for Information Science and Technology</td></tr>
<tr><td colspan="3">New York Review of Books
Times Literary Supplement</td></tr>
<tr><td colspan="4"></td></tr>
</table>

refer to place, to within and outside. In primarily oral societies, utterances were inherently located in space and time and were not just metaphorically placed. An idea of holy or sacred space, in which only certain utterances are permitted, still persists.

Mediating function

The mediating function taken by certain publications need not be bi-directional. While, for example, *Nature* both communicates with a number of disciplines (also functioning as a trade or professional journal) and, partly through press releases, with the exoteric public, other trade journals of academia, such as the *Times Higher*, communicate primarily with the scholarly sphere. They may be used by policy makers in the exoteric or wider public sphere to communicate with the scholarly sphere as a whole.

Proximity of the utterance within the discourse community

An idea implicit in these discussions, particularly in the directionality of the mediating function, is that of the proximity of the utterance within the discourse community. Proximity is not necessarily bilaterally equivalent in strength: for instance, the readers and authors of *Scientometrics* will regard utterances about bibliometrics in exoteric spheres as highly proximate while utterances in *Scientometrics* are generally ignored by the wider public sphere.

The power of the idea of the proximity of the utterance within the discourse community can be realised when it is understood also to constitute the test of trademark infringement, applying across changed geographic extent for electronic commerce. It could also be detected in widely held, although not necessarily formalised, conventions for seminars, where, if a member of the audience is known to be strongly identified with a view opposed to that of the speaker, registering of disagreement is expected.

Infrequent convergence of esoteric and exoteric spheres

Studies of the dissemination of other scientific (more natural scientific) topics conducted by science communication students (who had indicated that they found the way of thinking embodied in the original paper very helpful) supported the suspicion that there is relatively infrequent convergence between the esoteric and exoteric spheres. Convergence could be identified as specific communicative events. Between events of convergence, the esoteric and exoteric spheres tend to function autonomously, until further instances of connection. In terms of the communication model, this is supported by the relatively small number of mediating publications, compared to the diversity of esoteric and exoteric spheres. For the purposes of data analysis for more extensively reported topics, isolating such events would enable a meaningful restriction on the extent of data to be analysed, with a focus on crucial transitions.

Disaggregated knowledge

One generic theme which emerged from the Warner (1997) study was the possibility of disaggregated public knowledge, of understandings which could be derived and synthesized from a number of contributions, but which are not present in any single contribution. In relation to the RAE, the influence of place on potential for research was detected and the strongly patterned distribution of research excellence within the United Kingdom has been noticed by other studies (including Lewison, 2003). Curiously, in the public discussion of the RAE 1996, this was implied in the repeated analogies made between the league tables of universities and those of professional football (some will recall the correlation between the founding members of the Football League and the locations for the industrial revolution) and was not made fully explicit. Academics, as social beings, may be attracted to pleasant locations and there are reinforcing effects.

Students critiquing papers suggested that such insights should be taken outside the communication model and studied separately. This implies that the communication model, while robust and analytically revealing with regard to forms of communication, is not necessarily analytically revealing with regard to topics discovered.

Predictive value of the communication model

The distinctions embodied in the communication model proved capable of describing and predicting literature about the RAE. A level of granularity of literature indicated in the original paper, but not directly investigated, was the intra-disciplinary discussions, which tended to focus on the discipline of assessment. One contribution not immediately assimilable to this model was Warner (1997) itself, which was not concerned with the discipline of assessment or with using bibliometric techniques. It could be regarded as esoteric contribution with the possibility of wider exoteric interest.

Information retrieval techniques

Information retrieval techniques and resources were the basis for the acquisition of the data for the paper. In contrast, to paper indexes or serial searches of media, far less labour is required at the point of searching to identify and retrieve data. Technological developments have made extensive social epistemological studies possible.

Information resources are developing and patterns of provision are changing. To conduct an analogous study of the RAE 2001 would be more complex: there has been some migration of files of newspapers to other providers and, more significantly, a growth of institutional Web sites, creating problems of selection and filtering of a mass of material.

Recall of literature on the Research Assessment Exercise was possible through phrase searching (good editorial practice leads to full mentions before acronyms are introduced). With the further diffusion of the topic, acronyms and indirect discussions may have become more common, creating problems for full recall (RAE also exists as a name). Other topics, for instance copyright in computer programs as literary works, would present severer – effectively insuperable – problems of isolation and recall of relevant documents, given the multivalence of potential query terms when abstracted from their discursive context. Direct scanning of media at selected dates (for instance, following the parliamentary discussion or instantiation of copyright legislation) would be, and has been, required.

Information resources and techniques are well understood within information science, but less well known and understood in other disciplines, although knowledge of their existence has been increasingly diffused through Internet search engines and directories. There would be potential for export of understandings and techniques from information science to other esoteric spheres and to the wider public.

Information transfer: an explicable process

One value of the approach of Warner (1997) is that it demonstrates, and does not simply assert, that information transfer is an explicable not a mysterious process. The approach could be described as materialist, in that the transference of an idea is never assumed without looking at the particular mechanism of transmission (and the methodological exclusion of oral communication is not confused with any lack of substantive significance).

Science communication students were able to apply techniques and the communication model to other, more natural scientific topics, demonstrating the robustness and utility of the methods for retrieval and analysis of data and of the distinctions made in the communication model. The esoteric-exoteric distinction could be replied recursively and the esoteric need not be solely understood as the scholarly. Discussion at the conference revealed analogies between the processes of dissemination of scientific information (by press releases connected with conference papers) and government statistical information (press releases in connection with major publications, such as *Social Trends*). Recent historical changes have not directly disturbed these patterns but have enhanced possibilities for direct public viewing of primary sources, by electronic access.

Students also used citation analysis for tracing the diffusion of ideas in esoteric scholarly spheres (their concern was not immediately with comparative evaluation of the quality of published research). We now have techniques and a historically unprecedented opportunity for recovering public knowledge in the scholarly and wider public sphere and studying it, at various levels of aggregation.

Further development

What further developments have been considered? One strategy would be to contextualise and develop distinctions, drawing on the philosophy of science, to recover and substantiate distinctions made between esoteric and exoteric circles in science, particularly by Ludwig Fleck (1979). The sociology of texts, developing from the 1985 Panizzi lectures and becoming increasingly influential would be a further resource (McKenzie, 1986).

Such contexts could be both legitimating (identifying social epistemological studies as a legitimate domain for information science) and informative (developing distinctions made). To date, they have been more legitimating than informative, except in so far as encouraging a restriction on further model elaboration. At one stage further elaboration of a rather skeletal communication model was considered. Yet dialogue with students suggests retention of the basic distinctions in the communications model and a concentration on greater descriptive richness, obtained through a series of studies, rather than direct model elaboration:

> Prior knowledge of the topic coupled with intuition as to the result, lends a significant subjective quality to the study. This does not detract from the model and techniques used, it does instead realise the potential that such a simple model encapsulates (Comments received from MSc Science Communication student, 2001).

Model elaboration might reduce the simplicity and attractiveness of the distinctions made. Even Fleck, although carefully distinguishing esoteric and exoteric circles in science (there are both analogies and contrasts with Kuhn's work), does not formalise these distinctions further.

Patterns, both of communication and information resources, are changing. In an irony not unknown in system modification, the forces (the intensification of electronic communication) which make such studies possible are calling the categories established into question. Locating Internet communications in intellectual space is more difficult than for printed journals. There is some evidence that communication with other disciplines is facilitated by publication in electronic journals. Electronic publications can therefore be regarded as closer to transdisciplinary space than printed documents, whose circulation may be more restricted, without additional document retrieval labour by the reader. Previously separate esoteric spheres may be converging as part of this process.

Non-written public knowledge exists, including oral and graphic forms, although these were excluded on methodological grounds from Warner (1997) and student studies. Forms of communication other than written language, including both oral and non-verbal graphic communication, may require greater human labour in indexing and the costs of human labour may discourage production. In addition, legal deposit and library collection practices have been oriented towards printed not broadcast media. The omission of non-written public media inevitably restricts the scope of studies.

A unique historical opportunity for transforming the social epistemology envisaged by Shera and Egan in the 1950s (Shera, 1965) into recurrent research practice exists. Shera and Egan's primary intention for social epistemology was to inform bibliographic arrangements, by matching patterns of bibliographic provision to patterns of intellectual consumption. The concern here is with the distribution of public knowledge and possibility of synthesising disaggregated public knowledge. The opportunity for social epistemology could be regarded as the Word made flesh.

There are emerging signs of cognate interests, independently developed, in economics. A crucial issue in the developing field of information economics will be, "how and how well organizations and societies absorb new information, learn, adapt their behavior, and even their structures; and how different economic and organizational designs affect the ability to create, transmit, absorb, and use knowledge and information" (Stiglitz, 2000, p. 1471). Descriptive richness in social epistemology could then be assisted by the collaborative labour of other disciplines. Information science could contribute information retrieval techniques and an understanding of communication, particularly scholarly communication.

Conclusion

The freedom of academics to reflect and write is enabled by forms of labour (agricultural, industrial, and commercial) which are immediately essential to communal survival or at least command a more direct exchange-value. There would, then, be an implied responsibility or virtual contract to return the products of the intellectual activity enabled to exoteric labour, for instance, to inform policy (which might also have indirect rewards in support for research). Roland Barthes, quoted in Warner (1997), insists that the task of research must be perceived in desire and that desire arises from reader demand not direct institutional payment. One aspect of reader demand might be exoteric communication.

Some related issues emerging from discussion with conference participants were that attitudes which form grounding assumptions for academics and whose strength is matched by the infrequency with which they are articulated may not be shared by policy makers, including elected politicians, with whom they attempt to communicate. Rationality, using evidence to support assertions, valuing formal written communication regarded as an end in itself (reflected in the prestige attached to publication) are fundamental to academics' professional ethos. Policy makers, by contrast, may prefer oral communication (with a strategic balance between monologue and dialogue), may value formal written communication as a means of action rather than as an end in itself (consider legislation as action), have weaker notions of rationality, and be guided by strategic considerations, including electoral advantage, in their choice of policies to support. To communicate with policy makers, adjustment must be made to their framework of persuasion. If academics cling too rigidly to their grounding assumptions (and the first step in liberation might be to recognise them) they may lose the opportunity of influence and invite the response Faithful received from Bunyan's jury, "'Hanging is too good for him,' said Mr Cruelty" (Bunyan, 1987b, pp. 85-6).

Note

1 Students were taking a MSc Science Communication run jointly between Queen's University Belfast and Dublin City University, in 1997-1998 and 2001-2002. The 1997 cohort were given the opportunity to compare the approaches of Warner (1997) and Oppenheim (1995), as an alternative amongst information resources assignments. In a more developed programme, the 2001 cohort were asked to carry out studies of the dissemination of scientific topics in scholarly and wider public domains, using citation analysis and the communication model and techniques of Warner (1997). Reflection on the value of the techniques and the communication model, in relation to the specific topic studied, was also requested.

References

Bunyan, J. (1987a), *Grace Abounding to the Chief of Sinners*, Penguin, Harmondsworth.

Bunyan, J. (1987b), *The Pilgrim's Progress*, Penguin, Harmondsworth.

Fleck, L. (1979), *Genesis and Development of a Scientific Fact*, Treen, T.J. and Merton, R.K. (Eds), translated by Bradley, F. and Treen, T.J., Chicago University Press, Chicago, IL.

Garfield, E. (1998), "From citation indexes to infometrics: is the tail now wagging the dog?", *Libri*, Vol. 48 No. 2, pp. 67-80.

Lewison, G. (2003), "Beyond outputs: new measures of biomedical research impact", *Aslib Proceedings*, Vol. 55 No. 1/2, pp 32-42.

McKenzie, D.F. (1986), *Bibliography and the Sociology of Texts (The Panizzi Lectures 1985)*, British Library, London.

Oppenheim, C. (1995), "The correlation between citation counts and the 1992 Research Assessment Exercises ratings for British library and information science departments", *Journal of Documentation*, Vol. 51 No. 1, pp. 18-27.

Roberts, N. (1979), "Ten years of library journals in Great Britain, 1969-1979", *Journal of librarianship*, Vol. 11 No. 3, pp. 163-82.

Shera, J.H. (1965), "Social epistemology, general semantics, and librarianship", in Foskett, D.J. (Ed.), *Libraries and the Organization of Knowledge*, Archon Books, Hamden, CT, pp. 12-17.

Stiglitz, J.E. (2000), "The contributions of the economics of information to twentieth century economics", *The Quarterly Journal of Economics*, Vol. 115 No. 4, pp. 1441-78.

Warner, J. (1997), "The public reception of the Research Assessment Exercise 1996", *Aslib Proceedings*, Vol. 49 No. 10, pp. 263-76.

Warner, J. (2000a), "A critical review of the application of citation studies to the Research Assessment Exercises", *Journal of Information Science*, Vol. 26 No. 6, pp. 453-60.

Warner, J. (2000b), "What should we understand by information technology (and some hints at other issues)?", *Aslib Proceedings*, Vol. 52 No. 9, pp. 350-70.

Digital journals, Big Deals and online searching behaviour: a pilot study

David Nicholas
Paul Huntington and
Anthony Watkinson

The authors

David Nicholas, Paul Huntington and **Anthony Watkinson** are at the Centre for Information Behaviour and the Evaluation of Research (ciber), Department of Information Science, City University, London. E-mail: nicky@soi.city. ac.uk

Keywords

Digital communications, Libraries, Electronic publishing, Online retrieval, Journal publishing

Abstract

Evaluates, through deep log analysis, the impact of "Big Deal" agreements on the online searching behaviour of users of the Emerald digital library Web site, which provides access to more than 150 journals in the fields of business and information science. The purpose of the evaluation was to map the online information seeking behaviour of the digital library user and to see whether those signed-up to a Big Deal arrangement behaved any differently from the others. In general they did. The real surprise proved to be the strong consumer traits of the library's users. Research reported here refers to the first stage of a three-stage research project.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings: New Information Perspectives
Volume 55 · Number 1/2 · 2003 · pp. 84-109
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310462742

Introduction

The "Big Deal" was introduced as a solution to the "serials crisis" and was first developed during 1997 by the leading Library Consortium OhioLink and Academic Press, and then taken up by others including Elsevier Science, Blackwell and Emerald. The basic essentials of the Deal are that the publisher continues to receive the same amount of money as they received from print subscriptions from all the libraries in a consortium. For a small surcharge, all the libraries in the consortium receive electronic access to all the journals published by a particular company.
Tom Sanville (2002), the prime begetter of this idea lists the advantages of the Deal as:

- Increasing content delivered per dollar/ pound spent.
- Stabilising economic relationships.
- Maximising content delivery per publisher.
- Maximising use via electronic access.

The Big Deal has triumphed in North America. Only two serious research libraries have not taken it up. In the UK the reception has been somewhat mixed.

There are a number of important information players in the digital journal field with strong vested and entrenched interests, and they all believe – or state – that they are serving the interests of the reader or consumer – who are mainly, but by no means exclusively, academics. The Deal is in fact described as a win/win/win situation in that all the participants, libraries, publishers and authors/ users benefit from it. However, the point about the Big Deal is that it is a deal jointly decided by and jointly backed up by both libraries and publishers and perhaps authors also, for whom the advantage to the authors is wider access to their material. But what are the real and perceived advantages to the user? Indeed, generally, what do the users do? This is what this paper attempts to seek. It is about the actions of the users rather than their views. The bigger project will cover views.

Despite widespread industry interest in what is plainly a strategic topic to all interest groups, large scale and comprehensive evaluations of the changing use patterns that are manifesting themselves as part of widespread electronic access to journals, through such programmes as the Big Deal, are surprisingly thin on the ground. There are a number of studies devoted to working out how to obtain and how to handle usage statistics (see for instance, Montgomery, 2000; Mercer, 2000), but analyses concerned with evaluating the Big Deal in particular have largely come from OhioLink – and their findings are thought to be controversial, selective and tainted by self-interest. Matters are further clouded by the fact that, due to data protection considerations, consumer confidentiality and commercial considerations, very little data or evidence has in fact been released.

Logic and our experience from other fields – the media and health[1], would lead us to believe that something major has probably occurred as a result of the user:

- being provided with easy access to data that was previously far from easy to access (from both a physical and information retrieval point of view);
- being provided with massive journal and article choice, which might lead to the kinds of "promiscuous" behaviour you see on the Web; and
- offered a level playing field; all members of the Deal – big, small, urban and rural, have the same levels of access; arguably small organisations profit most.

It seems likely – although clearly we should not rush to pre-judge things – that improved access and choice should be changing things; whether that is slowly, quickly or patchily we are not quite so sure. We are already getting wind of what these changes might be. Thus data from OhioLink appears to show that some of the most used journals are not those that the libraries originally subscribed to in print form. If true it shows the development of the classic consumer trait of people shopping around, making up their own minds. It may also put a question mark over journal selection policies – and the role of the intermediary, too. Or, as Anthony Watkinson (2002) has argued, it could be down to the new types of people who are accessing the journals. The reason for the impressive usage electronically of journals not selected for purchase in print could be owing to the non-discriminatory activities of students writing term papers or preparing for research. Interestingly, an article by Phil Davis (2002) based on NERL data comes up with contradictory results to OhioLink. Plainly, we need to investigate this further for the truth.

Further data from OhioLink appears to show that journals are not substitutable for one another (Kohl, 2002). In other words, as new journals are added to the database, there appears to be no decline or slowdown in the use of journals of previously loaded publishers. The assumptions being that patrons are not switching from one title to the other. In other words, there appears to be no signs of consumer promiscuity. For the sciences this is thought to be axiomatic that each journal is a unique collection of papers with characteristics in common (Mabe, 2002). You might expect more porosity in the humanities and social sciences. Overall, it is thought that the STM element predominates simply through sheer numbers and therefore the STM effect predominates for journals as a whole.

Finally, Don King (2002) has found that increased access to electronic journals may result in scientists reading from a broader range of journals and spending less time on each individual journal. Certainly this is our experience of the Web.

The authors were commissioned by the Ingenta Institute specifically to test the above data and assertions, and more generally to determine what impact Big Deals were having on the user.

Aims and objectives

Big Deals for the user are essentially all about choice and enhanced access and the project's[2] broad brief was to determine whether this has resulted in any changes or differences in behaviour, both online and offline. The specific project aims were as follows:

1. To chart through usage logs how the user behaves in the digital information domain of plentiful choice created by the Big Deal and to identify any changes that were occurring in information seeking behaviour.
2. On the basis of this data, set about framing interview questions and questionnaires for Big Deal (and non-Big Deal) users about their information seeking in the digital environment.
3. To determine what all this means in the wider academic, economic, political and social context. In other words what outcomes result from the widespread availability of digital journals occasioned by the Big Deal – better research, improved teaching, better control of events?
4. Examine the logs in the light of the experience we have obtained from our deep log evaluations of the newspaper and health fields.

This paper provides early sights, an early "cut" of the data that are emerging, which largely relate to the first aim named above.

Methods

Case study approach

There was a need to pilot and hone our methodology and in this connection the Big Deals of two publishers were chosen for investigation. British publishers, albeit with international portfolios, were chosen because of convenience and the fact that they were more likely to release data to us (US publishers and librarians are more wary of the data protection aspects of log data). We needed publishers who had much to learn from the research (and therefore would be co-operative) and had a close grip on the situation so we could drill-down and obtain causal data and general explanation from publisher, client organisation and user.

The two publishers that fitted the bill were Emerald and Blackwell Science. The fact that one was a business/social science publisher and the other a STM publisher, one a medium sized publisher and the other a large publisher was an added bonus. There are undoubtedly problems in making comparisons between vendors. Indeed, most library interests (such as ARL) do not believe this type of comparison will be possible until standards such as COUNTER (http://www.projectcounter.org/news.html) is working on become generally accepted. We have some experience of making comparisons between the logs of different digital platforms (Nicholas *et al.*, 2001a).

Presented here is work in progress concerning Emerald only.

Logs

As mentioned above log analysis was the methodology of choice. All digital information services, including digital libraries like Emerald's, have a facility by which logs are generated that provides an automatic and real-time record of use by everyone who accesses the system. The kind and amount of data that can be harvested varies between platforms and services but essentially the data is much the same. Log analysis is all about squeezing the maximum data from the skeletal logs and carefully interpreting the resulting information to provide those important initial sketches of the information landscape, which provide the foundation for the long-term analysis of change and the source of questions for use in questionnaires and interviews.

There were a number of important reasons why we majored on log analysis. First, logs provide fairly concrete and abundant evidence of use – and also somewhat less concrete evidence of satisfaction. With log analysis it is possible for researchers to monitor the use of a system by millions of people around the world. This is a far cry from some of the assessment and monitoring methods of the past, which were based on small and unrepresentative samples (a few dozen "tame and pliant" users – students and academics typically). Logs record use by everyone who happened to engage with the system, there is no need to take a sample. This might, of course, lead us to question the validity of what we have learnt from past studies employing less robust qualitative methods. The great advantages of the digital logs are not simply their size and reach, although the dividend here is indeed a rich and unparalleled one. Just as important is the fact that they are a direct and immediately available record of what (thousands/millions of) people have done: not what they say they might, or would, do; not what they were prompted to say; not what they thought they did (the traditional domain of questionnaires). The data are unfiltered and speak for themselves. This is especially important in an area, like digital information use, where users are easily intimidated and new to the whole thing. There is nothing wrong with questionnaires and interviews but used on their own – and in a vacuum – in a rapidly emerging, fluid, difficult and sensitive area, they may prove misleading. Yet used to investigate further the patterns and issues emerging from the logs and they then become energised and powerful research instruments, which is how we shall use them in the second part of the study.

Second, because the data are being collected routinely, seamlessly and continuously it means changes can be mapped as they occur. Something that has to be very important as it is still early days systems-wise and many consumers are yet to fully engage with the world of digital information consumption and make their presence felt. Dynamic methods are needed to study fast changing environments – and this might be the case in this particular environment[3]. Of course, we are only offering up a snapshot in this particular paper.

Server logs were obtained for the whole of June 2002. The entire log file consisted of 4.5 million lines spread over about 20 servers – a significant dataset by any count. The file arrived with log information combined from the different servers. The log files are not typical of Internet log files in that the logs do not record files delivered but requests for document forms. An example of Emerald log lines is shown in Table I.

Lindoro 1791 refers to the server; what then follows is the date and time of the request. Following on in block capitals is the type of request. WWWISSUES is a request for a table of contents for a journal issue. After that we get a whole range of lower case alphabetic codes. They have the following meanings:

- Ac = account: the account (CID) that provided access to the content.
- Acs = temporary account: the accounts that the user was recognised as.
- User = the username entered into the login form.
- Pas = the password entered into the login form.
- Nw = the network that the content is held on – "1" for all Emerald Content.
- Unq = the unique identification number used by the server to write and read user cookies.
- Val = the equivalent of the VL number on the URL – the validation number is internal reserve information used to identify and track the user.
- Cns = the contracts which the user has been recognised as having in the same format as the "acs" item.
- Pubs = the number of and identification of any publishers the user has been recognised as.
- Acsnew = the number of new accounts the login action has added to the user information.
- Cnsnew = the number of new contracts the login action has added to the user information.
- tt = the title identifier or titnum internally used to identify a journal.
- Pb = the publisher identifier used internally to identify a publisher.
- Vl – the volume number of the requested item.
- Nm – the issue number of the requested item.
- Sp – the supplement identifier of the requested item.
- Sc – the section number of the requested item.

Results

Users and categories of user

The population of users was determined by those who used the Emerald site. This means that the population is not purely academic in nature. Thus we will also have picked-up academics, students, researchers and practitioners. In fact, an analysis of IP addresses shows that just 45 per cent of users came from an academic institution.

The Emerald site might be best thought of as a large digital departmental store, which provides customers with plenty of opportunity to look around and sample the products and services on offer, and then provides a range of payment methods by which they can take the full-text product away with them. All products have a high degree of digital visibility. Access to the Emerald site is then

Table I Example of Emerald log lines

```
lindoro: 1791 24/6/2002 11:23:24.51 13: WWWISSUES acs=11014 tt=1148 pb=106 vl=0 nm=0 sp=0 sc=0 sc=0
unq=63498784 ver=5000 ini=emerald bini= wis=emerald
lindoro: 1791 24/6/2002 11:23:29.99 18: LOGIN addr=65.214.36.158 user= pass= nw=1 vers=5000
unq=1415940992 port=WebTcp val=776911 ini=emerald bini= wis=emerald cns=0 acs=0 pubs=0 acsnew=0
cnsnew=0 brows="AskJeeves"
lindoro: 1791 24/6/2002 11:23:29.99 18: NONFREE tt=1152 pb=106 vl=37 nm=1 sp=0 sc=1 unq=1415940992
ver=5000 ini=emerald bini= wis=emerald
lindoro: 1791 24/6/2002 11:23:30.61 18: ABSTRACT tt=1152 pb=106 vl=37 nm=1 sp=0 sc=1 unq=1415940992
ver=5000 ini=emerald bin= wis=emerald
lindoro: 1791 24/6/2002 11:23:39.65 19: LOGIN addr=65.214.36.158 user= pass= nw=1 vers=5000
unq=1206048384 port=WebTcp val=1000494 ini=emerald bini= wis=emerald cns=0 acs=0 pubs=0 acsnew=0
cnsnew=0 brows="AskJeeves"
lindoro: 1791 24/6/2002 11:23:41.30 13: WWWCONTENTS acs=11014 tt=1148 pb=106 vl=7 nm=2 sp=0 sc=0
unq=63498784 ver=5000 ini=emerald bini= wis=emerald
```

open to everyone with Internet access, but full-text download rights vary considerably according to the class to which the consumer belongs, with Big Deal consumers having the best choice and access. A cookie reference and a user id number annotate all lines in the logs, which means we can identify the class, and most importantly the Big Deal subscriber. Thus by comparing this data with Emerald's list of subscribers it is possible to determine who were subscribers and who were not, and of the subscribers, who were signed-up to the Big Deal and who were not. Because our analysis was based on the "cookie reference" even if the user looked at something without entering their user id number we would still pick up the access as a subscriber access – we linked cookie to user id. In fact, the logs record a number of user identification codes: the subscription code that the user has logged in with, the user's login name and password, the IP number of the requesting client, as well as the cookie identification number.

Thus from the logs it proved possible to distinguish the following categories of user, which enabled us to benchmark the activities of the Big Deal user:

- *Non-subscribers*. These people can browse or search for journal articles, view tables of contents and abstracts and sign-up for an alerting service without supplying a username and password. Emerald is doing more than just laying bait – hoping that non-subscribers will convert to subscribers by allowing users so much freedom. For these people can also download full-text articles but, unless they were in Journal of the Week titles (see later for details), for which downloads were free, they will need their credit card to do so, which as we shall learn later they do use. Non-subscribers, of course, must form a very heterogeneous group. They could be anyone, but are most likely to be: students, using the system as an index to library collections from home; foreign users who were glad enough to have abstracts of UK material; the general digital information consumer just surfing around, coming in from a search engine; and robots (as there was no robot.txt file present, robots could not be identified before the analysis, hence robots are included in the analysis of non-subscribers).

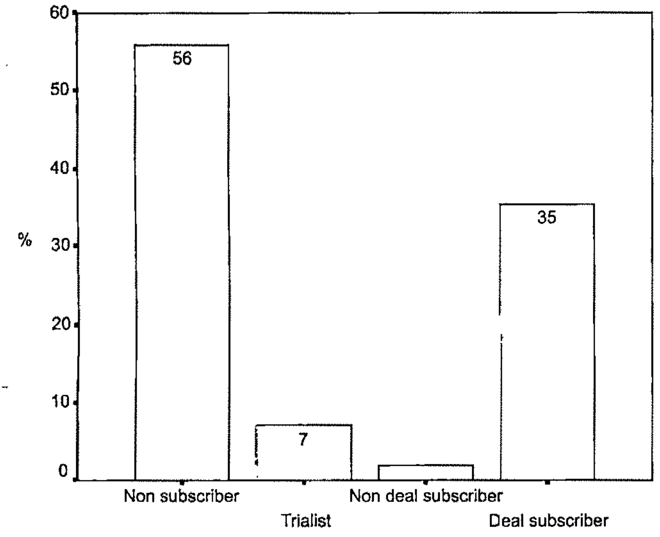
  Another group of users included in the non-subscriber category was people opting for a free trial subscription. They are limited to viewing five articles in full-text – thereafter they have to buy (e.g. pay-per-view), have a 30-day trial period and are requested to fill in a registration form. We have been able to isolate this group; we call them trialists, and some of the following analyses feature this group. It should be noted that Emerald is particularly keen on offering trials and the sorts of trials they offer are unusually generous by publishing standards.

  Non-subscribers provide an interesting group against which to benchmark the behaviour of subscribers, who are more likely to be the traditional academic library user.
- *Subscribers*. They may have multiple login codes. There are two types. Non-Big Deal subscribers have limited access to a range of journals depending on the nature of the subscription. Big Deal subscribers, there were about 900 of them, get full-text access to 118 out of 154 of Emerald's journals. The vast majority of Emerald Big Deals are made through consortia. Within Emerald's Big Deals, no organisation's original subscription involved more than 60 journals. In fact most of them subscribed to less than ten journals. What basically happened was this. An organisation subscribed to four journals, they negotiated a Big Deal (for three years), then were provided access to 118 journals plus their four journals (which may or may not have been part of the Deal) and must maintain their spend for the three years of their agreement. What this all meant was that the vast majority of subscribers significantly increased the range of journals they had access to.

Not all Emerald journals are in the Big Deal because some journals were acquired after the Big Deals had been signed and also some subject areas (e.g. engineering) are not included as part of a Big Deal.

During June 2002, 154,536 "people" used the service, a testament to how popular digital libraries, like Emerald's truly are. Of these an astonishing 96,908 (63 per cent) were non-subscribers, including trialists, who accounted for 7 per cent of all users (Figure 1). Plainly this is an open consumer site in anyone's terms, and has little in common with its predecessors like Dialog and DataStar. It also suggests that there are plenty of casual

Figure 1 Percentage of users by type of user

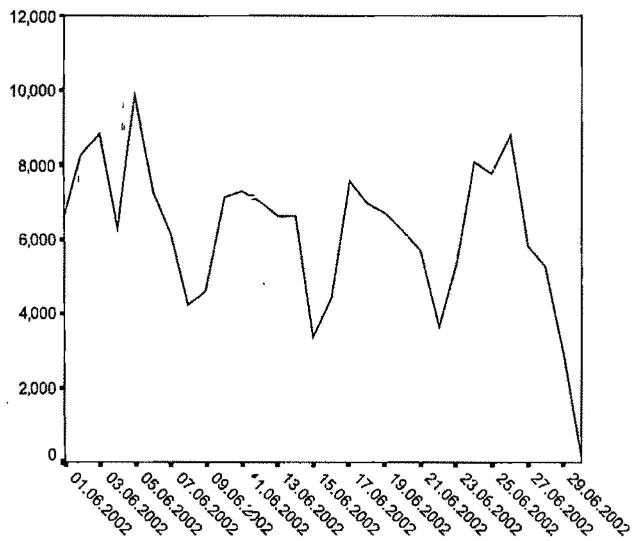


users seeking journal articles, certainly in the social sciences anyway. There were 54,741 Big Deal users and 2,887 non-Deal users. The Big Deal is by far the most popular subscriber option, and is a further testament to its success. Of subscribers, 2 per cent of all users were non-Deal subscribers and 35 per cent of users were Deal subscriber users.

Figure 2 shows that number of users varied quite considerably from day to day, from 4,000 to 9,000 users. Approximately 208 people used the system per hour.

Of course, any comparison between user groups is complicated (and limited) by the fact that we have no way of knowing whether non-subscribers or non-Big Deal subscribers were a party to other publishers' Big Deals. However, qualitative work will help us to establish this. There is another problem too. The cookie on a computer tracks use by that person on that machine. However, some computers, like those in the library, are shared and we have no way of knowing this.

Figure 2 Daily plot of user activity



Unfortunately, we cannot get much closer to users than this at present. This is because the vast majority of Big Deal subscribers employ IP authentication. IP addresses are either a central firewall IP or dynamically allocated at the time of use. Both of these methods do not lend themselves to identification of user class – department for instance, which would have been very interesting. The Emerald subscriber list does not furnish these details either. It would be good to determine the user's age and gender too, but that data will have to be obtained by other research methods. It would be good to identify use by librarians too. Their use is likely to inflate the use figures – possibly quite substantially. A cookie audit at a case study institution might fill in our knowledge gaps – we are currently investigating this.

Use

Defining use

If the term user is problematical when used in log studies, then what constitutes use and how you can measure it is far more so (for a discussion see Pullinger and Baldwin, 2002). Indeed, the word use itself has been questioned – it might be argued that use is not being directly measured. It might be more accurate to claim that what is being measured are "accesses", downloads, etc. We prefer the term "page requests" but do not have a problem with use.

Activity is clearly the defining characteristic of use, but what actually signifies it and whether all forms should be treated equally are the issues that need resolving. There is much potential for confusion. This arises partly from the use of the term hits, which is widely used by Big Deal vendors (like Emerald) and general Web sites alike. However, they are often using the term differently. There is an Internet convention to resolve use down to pages viewed – and this is in fact how we get the term hits[4]. In regard to a typical Web site, hits encompass all kinds of activity – arrivals by accident, people navigating through the site, viewing content, downloading a page, using a page as office "wallpaper", whatever. On the Web all hits (pages) are counted. In the case of Big Deal vendors the word hits is used in a rather more restricted way. It is most often used to mean a request – and a request for a "useful" page at that – like an abstract, full-text article etc. The most selective use metric employed is "downloads", and this refers to articles viewed or downloaded in full-text. Plainly this metric shows real interest and motivation, and from Emerald's perspective it is also a revenue generator, albeit a very small (but growing) one at present. Of course, the really big revenue generator for Emerald is subscriptions and, once you have a subscription payment, you do not mind very much how much use is made. However, article usage will become a major consideration in Big Deal renewal discussions in the future – at both the journal and increasingly database level. As an indicator for the future, then, it is pretty important.

Let us take the specific case of Emerald's raw logs to illustrate the problem. They identify the following activities (in brackets is the reference in the logs – see Table I):

- Request for abstract page (Abstract).
- Request for article (Article).
- Request via internal site link (i.e. reference and other links) (CGILink).
- Request for article format selection page (Fulltextreq).
- Request for article for which they do not have a subscription (Nonfree).
- Request for table of contents for a journal issue (WWWissues).
- Request for contents page of all issues of a journal (WWWcontent).

Most are self-explanatory, but two are not, and can – and do – lead to some confusion. First, the request for an article format selection page (Fulltextreq). This in fact logs the request for the full-text of an article, not its download. When the request is made there is a prompt to enter username and password and once the username and password are verified the article request is fulfilled, so successful logins would be picked up by the request for an article metric. Of course people request the full-text for journal articles they are not entitled to, and do not want to pay for. The value of this metric is possibly questionable, but it does reflect activity. Second, there is the request for an article for which no subscription is held (nonfree). This logs cases where a user, who has logged on but does not have a subscription to a journal/article, still tries to access the article. Instead they see the abstract page only. When such an access is made the "nonfree" request is delivered with the "abstract" request and provides information that is added to the abstract request. Table I gives an example and shows that the "nonfree" and "abstract" request are delivered at the same time – in this case within half a second of each other.

In fact, the hit statistics Emerald provide in their log reports for clients concern just the following metrics:

- Content page hits (content page hits include both types of content display – wwwcontent and wwwissue).
- Abstract hits (an abstract hit is where the user sees the abstract page and the option to download on the same page).
- Article hits (downloads).
- Non-subscribed hits (confusingly described, as it is in fact, our "old friend" the nonfree abstract). A non-subscribed hit is where a user, who has logged on but does not have a subscription to a journal/article, still tries to access the article. They see the abstract page only.

We can see what Emerald (in fact, Catchword, the suppliers of the log reports) have done:

- They have identified what they believe to be useful behaviour and counted that. This explains why fulltextreq is not included. CGIlink (which includes the citation search request) has been excluded on grounds of the inability to easily distinguish citation requests from other internal requests.
- They have separated out abstract counts according to whether the request was in fact for an abstract in the first place or whether the abstract was viewed as a result of an "illegal" request. Whether this separate counting of abstracts is warranted is open to doubt.

A typical Internet site owner would include both fulltextreq and CGIlink pages as "hits" and would not distinguish between the kind of hits.

Of course, requests do not necessarily equate with pages or screens viewed. Thus when you do a search and view that search you might have to scroll ten screens to see what you want; now that is one request but many screens viewed. Similarly, for articles, one request retrieves an article but when you view it online it could span 30 screens, maybe.

We are still experimenting with different use indices and we trial two in this paper –

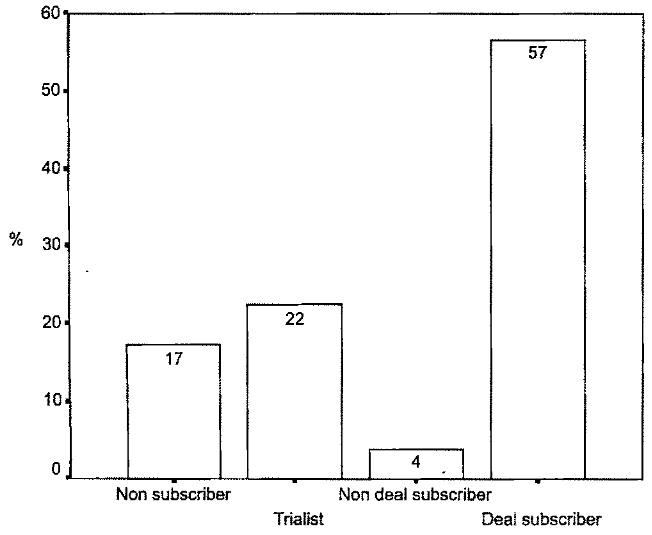
"useful requests" – requests for articles, abstracts, and content pages and article requests only downloads (the most useful of all requests). We are also working on employing the reference link as a metric.

It does not end there for once we have dealt with the problem of what to count we are confronted with the problem how to measure it. After all, there are many ways of measuring use and each way gives us a different "take" on how the system is used. They range from the simple numerical hit count to the more powerful metric of site penetration. Additionally there are time-based metrics. We are currently investigating the robustness of a number of use metrics and will in the future examine them in the light of COUNTER http://www.projectcounter.org/news.html, the industry's log standard gurus, thinking.

Actual use

During June an astonishing 2,437,811 requests of all kinds and 1,458,443 requests excluding Fulltextreq, Nonfree and CGI link requests were logged. The distribution of use over the user groups is fascinating and, possibly, not what might have been expected. Thus, while non-subscribers made up 56 per cent of users they actually only accounted for about 22 per cent of use (Figure 3). The majority of users accounted for the minority of use. Those opting for the trial made up 7 per cent of users but accounted for a sizeable 18 per cent of requests. Deal subscribers made up 35 per cent of users and accounted for the majority (57 per cent) of use. Plainly, just two groups – trial non-subscribers and Deal subscribers, generate a lot of site activity – about 75 per cent of it.

Figure 3 Percentage of use (articles, abstract, content requests) by type of user



Use over time

Change is a major concern of the long-term project but clearly one month's worth of data is insufficient for the purpose (we shall evaluate further months as the research proceeds). However, there is enough here to discern hourly and weekly patterns of use – the biorhythms of the academic digital consumer. Figure 4 shows the number of all daily requests (activity) for June 2002. The average number of daily requests (article, abstracts and content pages) was 51,010 requests and there were 13,121 articles downloaded on average per day. For comparison Figure 5 provides an analysis of useful requests only. The patterns are very similar, if not identical. Figures 6 and 7 give a

Figure 4 Daily plot of use activity (all requests)

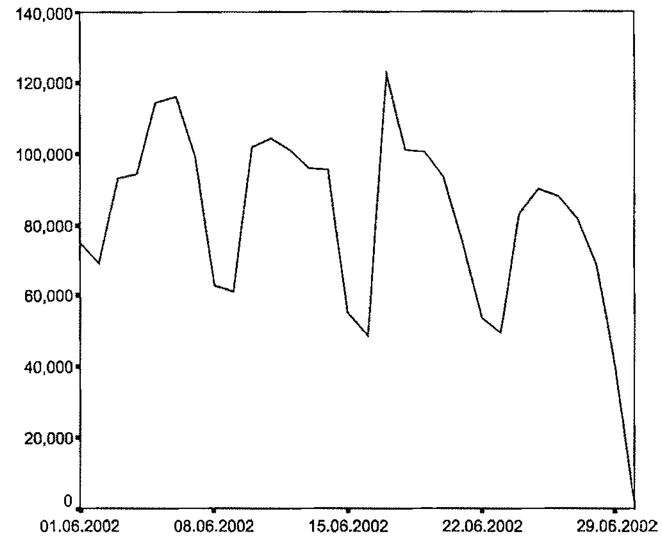
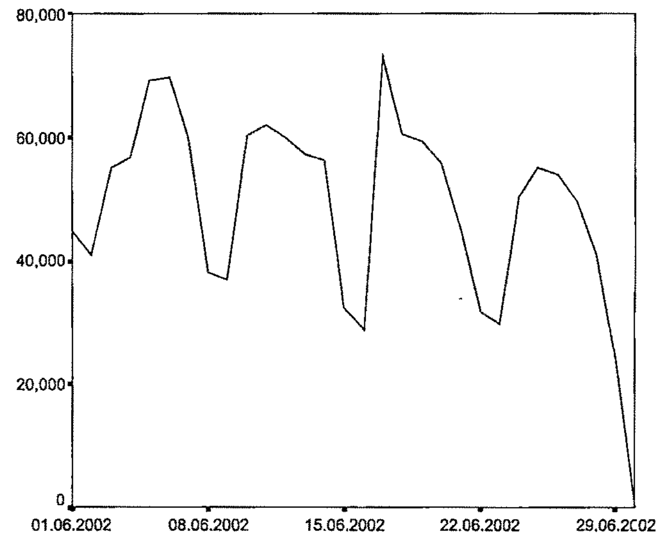


Figure 5 Daily plot of use activity (article, abstract and content requests)



break down for the individual kinds of requests – something that is taken up more fully in the section "Type of request".

The distinct, rhythmic patterns over time of both daily users and use is similar to that found in other digital use studies we have conducted (Nicholas *et al.*, 1999; 2002a, b). In this way the academic consumer is no different than any other kind of digital consumer. The low points record the relatively low usage on Saturdays and Sundays compared to weekdays. Sunday recorded just under half the use compared to midweek use. This could be because most people have access to the system at their places of work or study, or simply because people prefer not to spend their weekend working or studying. The former is probably more plausible, but qualitative work will confirm.

Figure 8 sheds more light on the topic, by showing the distribution of use over day of week. Approximately 9 per cent of all weekly use occurred on a Sunday, substantially less than the 16 per cent of use recorded for weekdays. Use fell off on Friday to 14 per cent and Saturday also recorded a lower figure of 12 per cent. Wednesday and Monday recorded the highest daily figure (17 per cent). Previous studies (Nicholas *et al.*, 2001b) also found Wednesdays to be the most popular day to view Web-based information.

Figure 9 gives the distribution of use over hour of day (Greenwich Mean Time). Most use is recorded from about 9am to 3pm – 42 per cent of use occurs between these times. There is no obvious reason to believe that Big Deals change the hourly or weekly patterns of information consumption, but it is worth

Figure 6 Daily plot of use activity broken down by article, abstract and content requests

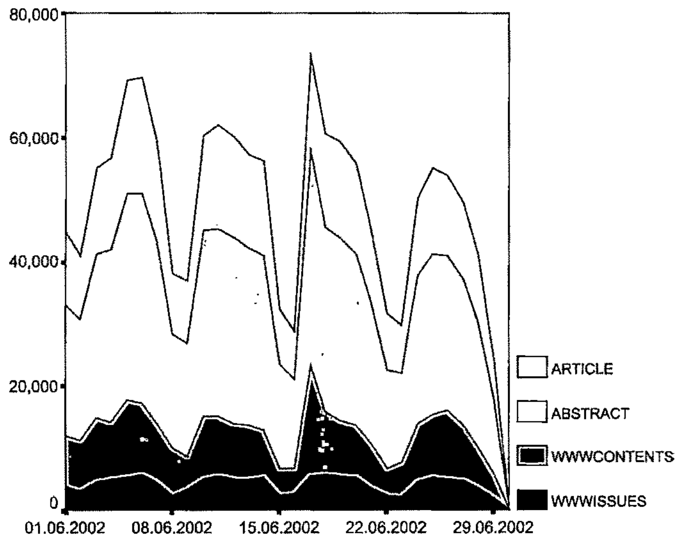


Figure 7 Daily plot of use activity as percentages broken down by article, abstract and content requests

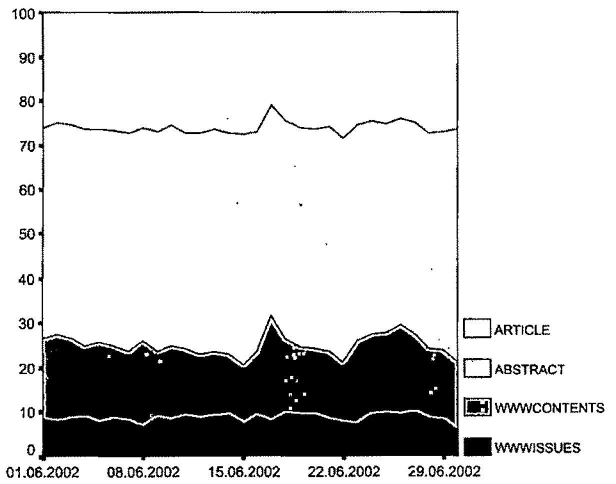


Figure 8 Percentage of use distributed over day of week

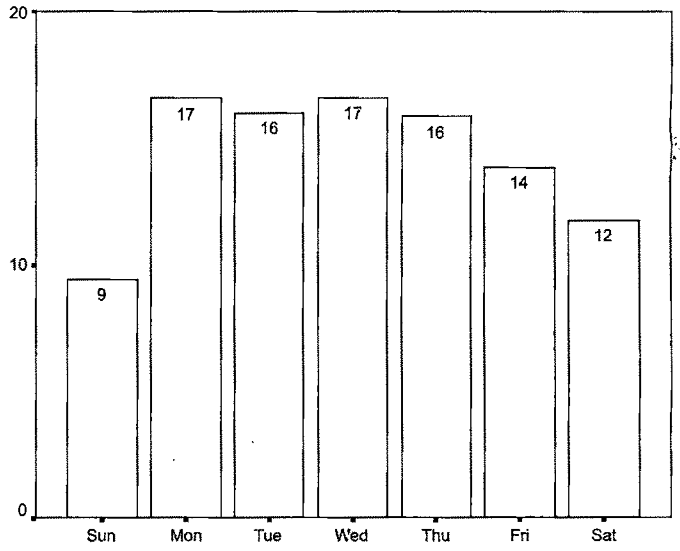
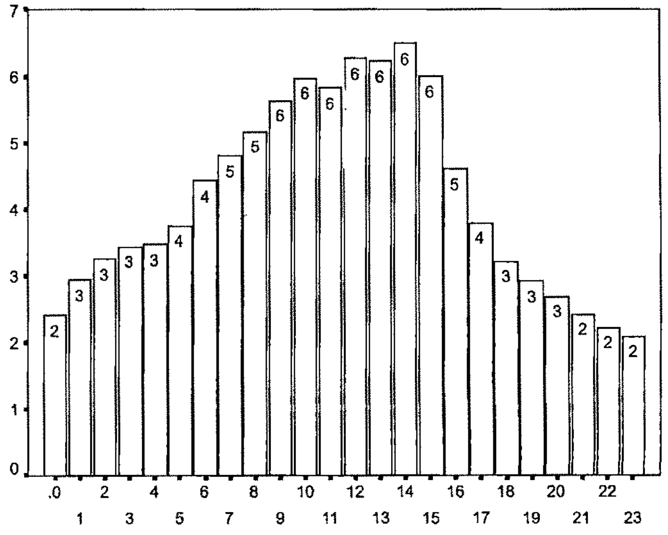


Figure 9 Percentage of use distributed over hour of day



testing this assumption. Figure 10 compares hourly use by subscriber type. Deal subscribers have a much more pronounced midday peak and use increases about three fold, and probably reflects the extensive number of UK Deal users logging on at about this time. Trialists and non-subscribers have similar patterns of use and might indicate that these users are the same type of user. Non-Deal subscribers appear to spread their use throughout the day, although the fact that there is not a lot of use coming from this group flattens the distribution somewhat.

Type of request

Figure 11 shows the distribution of use by type of request. Well over one in four requests (29 per cent) were for an abstract, 23 per cent of requests were for a "fulltextreq" (this is a "pre request" for an article), and 15 per cent for an article. One in ten requests related to the table of contents for an actual journal, which delivers the contents for many volumes (WWW contents) and 5 per cent of requests were for the table of contents for an individual issue. So 15 per cent of requests in all are for contents pages. Of requests, 9 percent were related to a CGIlink, which is an article reference and other type of internal link requests.

Figure 10 Use by hour of day by subscriber type

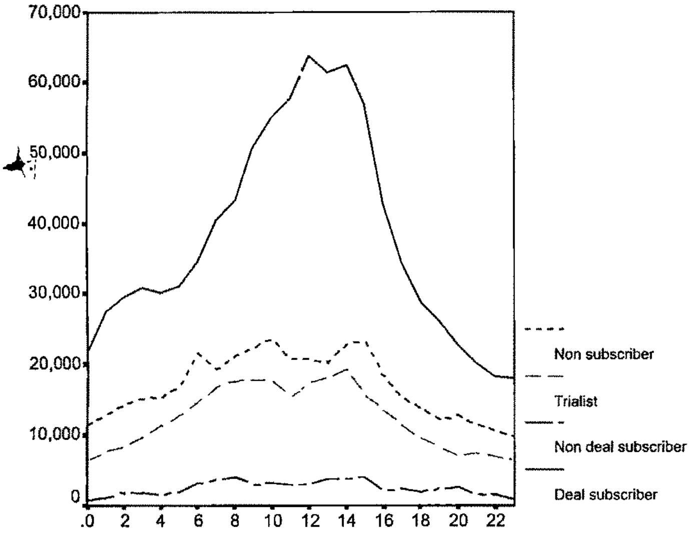
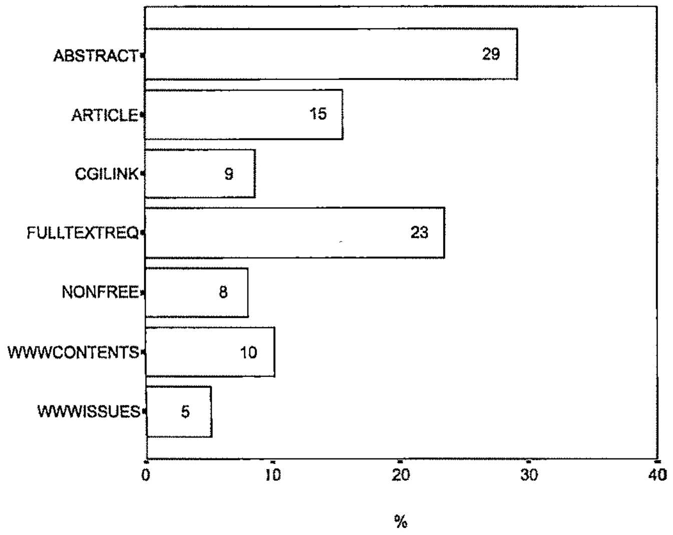


Figure 11 Percentage of use by type of request



The above analysis is plainly influenced by the fact that before you view a full-text article you have to see the abstract first.

Whether Big Deal users, with their greater choice and freedom of access, do anything different when online is clearly of great interest. Figure 12 shows the distribution of request by type of user and Figure 13 gives the same data but as a percentage bar chart. In absolute terms Deal subscribers make the most use of the site. In looking at the percentage bar chart it can be seen that non-subscribers tend to make more use of issue and content pages by some margin – they do not have automatic or upfront access to full-text articles, of course. Articles they do view are restricted to journals available free on the site made available via the Journal of the Week offer or for which they are willing to pay. Non-subscribers, aware no doubt of their limited access, are probably using content and abstracts to screen articles and carefully select their downloads, for which they then pay. Abstracts also feature strongly in the requests of trialists, non-Deal and Deal subscribers, though articles were equally important. Deal subscribers had the highest percentage share of abstract and articles and made up two-thirds of their told requests. Deal

Figure 12 Distribution of request by type of user

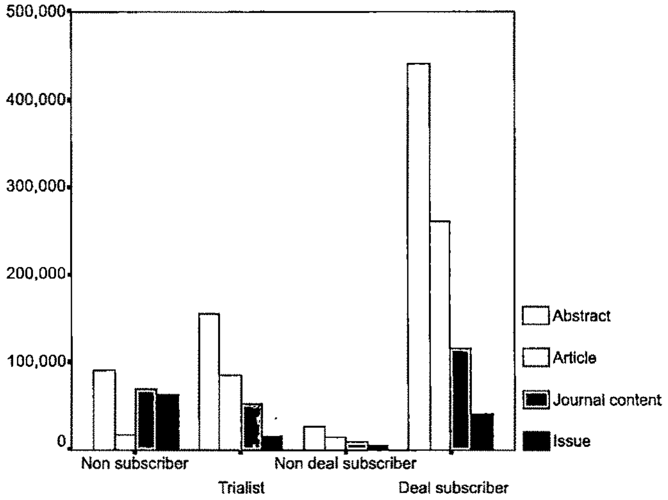
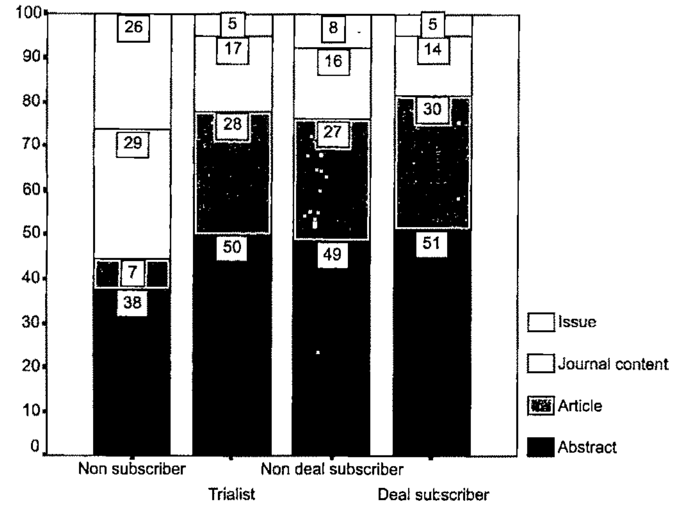


Figure 13 Percentage distribution of request by type of user



subscriber users were least likely to make use of content and issue information. There are a number of possible explanations for this. Possibly Deal subscribers regularly return to the same journals and hence do not have the need so much to see tables of contents. Alternatively Deal subscribers may well use the search facility, regular users are more likely to have invested the time in learning how to use the search facility as this provides a quicker way to finding articles. It could also be that student users prefer the search engine approach. The second stage of the project will see the examination of search logs, which are held on a different server.

Number of visits

In the wider world of the promiscuous digital consumer (a world full of choice), it is said that the more times a user returns to the site the more likely they are to be satisfied with it. Coming back to a site appears to constitute conscious and directed use – as good an approximation of this as you are likely to get from Web logs. All this makes return visits a powerful performance indicator. The industry calls this site "stickiness". But how frequently they return will depend on the nature of the site, and it is not clear what would constitute a "good" frequency for a journal site. However, almost by definition in the case of academics, one would have thought that subscribers would naturally develop a repeat behaviour in order to fulfil their current awareness needs. This raises the interesting issue of whether logs could be employed to monitor a key part of an academic's role, certainly in the case of "old-university" academics who have a contractual commitment to conduct research.

Table II provides a breakdown of the pattern of returnees over the month. Nearly nine in ten users visited the site just once in the survey period. Approximately 10 per cent of users visited between two to five times and half a per cent visited six or more times. This is probably not a surprising outcome given the limited date range of the survey. Emerald's own research shows that people do visit more frequently than once a month but that June data is probably a low point because of the end of the academic year. Further research will shed more light upon this.

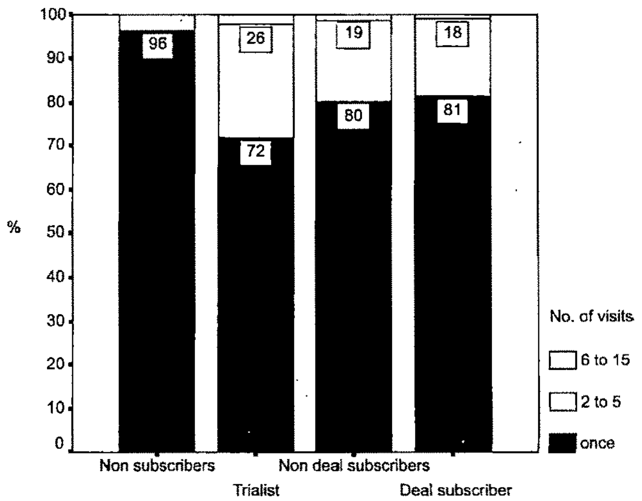
Of course, at present we cannot really be certain that it is the same people who visited, that is, if indeed these were repeat visits? Again, if it is somebody logging in from the library, or perhaps from the computer centre there might be a problem. We could be more certain with academic staff who have their own computers.

Figure 14 breaks down the number of repeat visits by the type of subscriber. Non-subscribers were least likely to revisit the site, which is not surprising – they have less to gain from a repeat visit (they have not paid upfront for access) and they are also probably opportunistic and promiscuous users. Over the month just 4 per cent of non-subscribers

Table II Visits within a month

	Percentage
Visit on one day	89.1
Visited 2-5	10.3
Visited 6-15	0.6
Over 15 times	None
	100.0

Figure 14 Number of visits (article, abstract and content page requests) by type of user

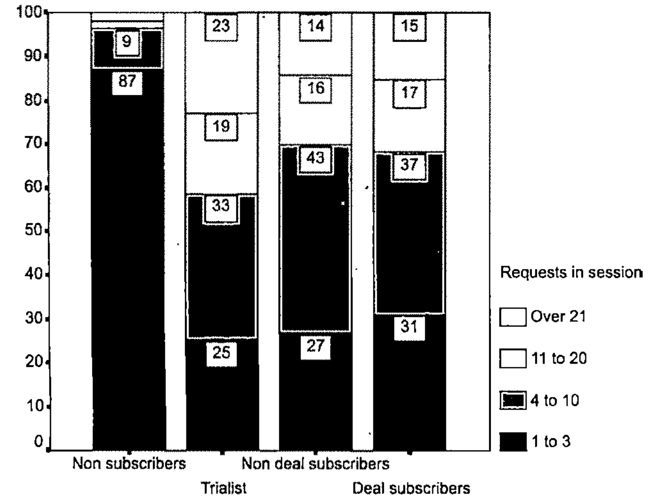


revisited the site two or more times. Trialists were the most likely type of user to return; 28 per cent of trialists visited the site two or more times. The fact that they only had a month's trial meant that their opportunity to revisit was limited, so they appear to have made hay while the sun shines, but five articles hardly signifies a lot of "sun". Plainly, they were also getting acquainted with the site. The percentage of people revisiting the site two or more times increased to approximately 20 per cent in the case of subscribers (non-Deal and Deal subscribers). Having a Big Deal made little difference. Maybe the number/range of journals available to a user is not an important current awareness driver. Choices are obviously prescribed in the journal world. Thus, to take an extreme example, people interested in librarianship are unlikely to be interested in pigment resin technology.

Level of activity on a visit/during a session

Like return visits, the average number of requests made in a session is a powerful metric, which shows how active, interested or busy (confused, perhaps) the user is. It also shows commitment. Figure 15 shows the percentage distribution of requests (article, abstract and content requests) in a user session by subscriber type. Approximately 87 per cent of non-subscribers made three or fewer requests in a session. The fact that they have more constrained facilities – the article download is more restricted to them, partly explains this. It might also be in part due to the fact that they are not so practised in moving around the site, as they are less familiar with the site because they visit less frequently. This conforms to the earlier finding, which showed that, while non-subscribers made up about 55 per cent of the users of the site, they actually accounted for only 22 per cent of requests. Some people land at the site, visit a couple of pages to see what is there and leave. We have come across such people before in our studies of the media and health – thousands and thousands of them, and in our previous Web studies we have labelled them "bouncers" (Nicholas *et al.*, 2001b).

Figure 15 Average number of requests (articles, abstract and content page requests) in a session by subscriber type



This contrasts markedly with the situation in regard to trialists, 25 per cent of whom made three or fewer requests. They were also the group most likely to make 11 or more requests in a session – about 42 per cent of this group did so. Evidently trialists are busy in all kinds of ways, they visit most frequently and they make most requests when they are there. In total 27 per cent of non-Deal subscribers and 31 per cent of Deal subscribers made three or fewer requests; and 32 per cent of Deal subscribers made 11 or more requests in an average session. This was true of 30 per cent of non-Deal subscribers – a small difference. Having more journal articles available to download might have been expected to increase activity levels more, but this does not appear to be the case.

No trialist or subscriber had sessions where only a content page was viewed. That is, both types of users all went on to view at least an abstract request. In total, over a quarter (27 per cent) of all sessions were sessions in which only an abstract was viewed and no article downloaded – most people bought what they saw in the digital shop window. All trialists' sessions were sessions that resulted in at least one article being viewed, while approximately 20 per cent of subscriber sessions (Deal and non-Deal) were sessions where no article was viewed. This might point to a form of browsing where abstracts are checked but the associated article was not looked at. In total, 80 per cent of subscriber (Deal and non-Deal) sessions did go on to view at least one article.

Well over half (58 per cent) of all non-subscriber sessions resulted in an issue or journal content request – these users also accounted for all content-only request sessions (i.e. where that is the only request made). Of the 42 per cent of non-subscribers who did go further into the site, 88 per cent viewed at least one abstract, but not an article, and 12 per cent viewed an abstract and an article. Either by paying to view the article or viewing a free article under the Journal of the Week article offers.

Time metrics

When vendors charged by time online, time was a key use metric but of course most Web sites do not employ this charging method and so it has lost some – but not all – of its potency. Time, after all, is still a precious commodity for the user. Table III gathers a number of specific time-use metrics together: all requests per hour; article, abstract content requests per hour; and article requests per hour. On average 3,077 requests were made per hour, of which 1,907 were articles, abstracts and content page requests and 475 were article requests.

Table IV provides overall estimates of average page view (or download) time comparing time spent on articles and abstracts. A skewed distribution of page view time was observed and is indicated in the table by the differences between the arithmetic mean and the median. In such cases the arithmetic mean will be biased and should not be relied upon. To compensate for this the robust estimators, the 5 per cent trimmed mean, and Huber's M-estimator were generated. Both give estimates of the mean average that are not sensitive to the underlying frequency distribution and give unbiased estimates of the mean. The 5 per cent trimmed mean does this by discarding the lowest and highest 2.5 per cent of the values and then computing the mean of the remaining values, Huber's M-estimator is a weighted mean estimate where extreme values are given less weight.

Articles recorded the longest view time of just less than two minutes; abstract view time was about a quarter of this and was just over half a minute. The average for all requests was just under half a minute – 24 seconds. We are probably comparing different things here as, presumably, few users are "reading" the article (although scanning in HTML is quite popular as we shall see later), whereas they are probably reading the abstract.

Table IV Estimates for average view time for articles, abstracts and all views

	Articles	Abstracts	All
Mean	444.2	173.1	176.5
Median	97	31.0	20.0
5 per cent trimmed	170.2	53.23	47.5
Huber's M-estimate	111.2	35.14	24.4

Table V gives average view time for just articles by type of subscriber. There are significant differences between subscribers. In particular Deal users appear to spend twice as much time viewing an article compared to non-Deal users. This difference may be due to unrestricted use available at universities. Universities are more likely to be Deal users and these users may prefer to read articles online. However, this difference may partly result in the use of PDF and HTML formats to view documents, rather than differences in interest or satisfaction. Future qualitative work might tell us when scanning becomes reading.

Number of journals viewed by subscriber type

All site users can view the abstracts and content pages of all Emerald journals – over 150 of them. Figure 16 shows the number of different journals viewed by type of subscriber in terms of article, abstract, and content views. In fact Deal subscribers were more likely to view a greater variety of journals, which is of course what the Big Deal is supposed to be all about, so they are getting – and taking advantage of – what they paid for: 63 per cent viewed two or more different journals; 39 per cent viewed between two to five different journals, 20 per cent viewed six to 15 journals and 4 per cent viewed over 15.

Table V Estimates for average view time for articles by type of subscriber

	Articles	Abstracts	All
Mean	381.6	333.5	490.7
Median	70.0	58.0	117
5 per cent trimmed	135.4	110.4	197.0
Huber's M-estimate	82.1	67.1	132.0

Table III Average number of users per hour, requests per hour and article requests per hour

	All requests per hour	Article, abstract content requests per hour	Number of article requests per hour
Mean	3,487.6	2,086.5	539.4
Median	2,992.0	1,792.0	474.0
5 per cent trimmed mean	3,386.6	2,026.6	527.1
Huber's M-estimator	3,076.5	1,906.7	474.5

Figure 16 Number of different journals viewed (article, abstract and content views) by subscriber type

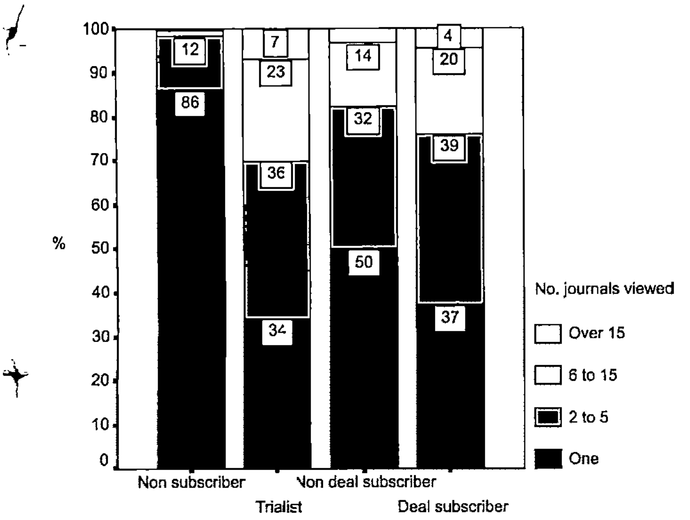
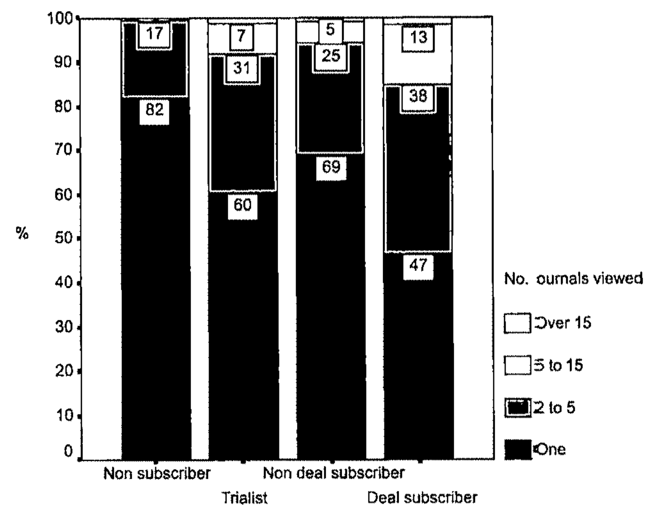


Figure 17 Number of different journals viewed (articles only) by subscriber type



Non-Deal subscribers were more likely to view just one journal, 50 per cent did so compared to 37 per cent of Deal subscribers. The availability of the Deal to users seems to have encouraged users to extend the range of titles viewed. Trial users again made good use of the site and were the group most likely to view two or more journals; 36 per cent viewed between two to five journals, 23 per cent viewed six to 15 different journals and 7 per cent viewed over 15 different journals. Approximately nine out of ten non-subscribers viewed just one journal.

All users can download articles, but only Big Deal subscribers have automatic rights to download articles from more than a hundred of them. Non-subscribers, like all users, can view articles freely via the Journal of the Week offer (see below), trialists can view just five articles while non-Deal subscribers are limited by the terms of their particular deal with Emerald, usually access to a handful of journals. The difference this makes in terms of the number of articles viewed from different journals is shown in Figure 17. This shows the number of different journals viewed by type of subscriber for article requests only. Here Deal subscribers are far more likely to view articles from two or more different journals: 53 per cent did so compared to 31 per cent of non-Deal subscribers, 40 per cent of trialist and 18 per cent of non-subscribers. This result is plainly a function of range of full-text access.

Table VI gives the average number of different journals viewed per subscriber organisation (all users from that organisation being bundled together for this analysis) by subscriber type. On average, non-Deal organisations viewed about five different journals and on average requested about 12 articles. While those organisations subscribing to the Big Deal viewed approximately 46 different journals and requested about 93 articles. Quite a difference: further evidence perhaps of the workings of the Big Deal.

There is a large difference between the use figures of the subscriber types. Non-Deal users requested significantly fewer articles and made use of fewer journals compared to those organisations subscribing to the Deal.

Individual journal titles viewed

The titles of the journal groups consulted are of interest, and the comparisons between them of special interest. Table VII gives the top ranked journals (according to all requests made) by type of subscriber. The top 15 journals accounted for 60 per cent of journal views in the case of non-subscribers (including trialists), 38 per cent for non-Deal subscribers and 36 per cent for Deal subscribers. The lower percentage for Deal subscribers indicates that use is distributed more evenly over a wider number of journals. It could be that they have a greater freedom of choice, or that they are

Table VI Average number of journals and articles viewed per organisation for non-Deal and Deal subscribers

	Non-Deal subscriber		Deal subscriber	
	Articles	Journals	Articles	Journals
Mean	59.2	11.13	344.8	51.6
Median	10.0	4.0	77.0	44.0
5 per cent trimmed mean	24.7	8.1	213.1	50.1
Huber's M-estimate	12.1	5.1	92.7	46

Table VII Journal use by subscriber type

Non-subscriber use of journals	%	Non-Deal subscriber use of journals	%	Deal subscriber use of journals	%
Integrated Manufacturing Systems [a]	10.0	*Int. Jnl of Quality & Reliability Man't*	6.2	*European Jnl of Marketing*	4.6
Industrial & Commercial Training [a]	9.0	*European Jnl of Marketing*	3.1	*Management Decision*	4.5
Int. Jnl of Operations & Production Man't	8.9	*Leadership & Organization Development*	3.0	*Leadership & Organization Development*	2.8
The Jnl of Management Development	5.1	*Jnl of Quality in Maintenance Engin.*	3.0	*Marketing Intelligence & Planning*	2.7
Int. Jnl of Public Sector Management [a]	4.7	*Jnl of Services Marketing*	2.7	*Jnl of Knowledge Management*	2.6
Employee relations [a]	4.4	*Jnl of Knowledge Management*	2.5	*Jnl of Consumer Marketing*	2.2
Int Marketing Review	4.2	*Accounting Auditing & Accountability Jnl*	2.3	*Int. Jnl of Contemporary Hospitality Man't*	2.1
Industrial Management & Data Systems	4.2	*Int. Jnl of Operations & Production Man't*	2.3	*Jnl of European Industrial Training*	2.0
Strategy & Leadership [a]	3.9	*Jnl of Organizational Change Man't*	2.0	*Personnel Review*	1.9
Team Performance Management [a]	3.8	*Int. Jnl of Service Industry Man't*	2.0	*Int. Jnl of Service Industry Man't*	1.9
Jnl of Intellectual Capital	2.0	*Management Decision*	1.9	*Internet Research: Networking Appls*	1.8
Reference Services Review	1.8	*Jnl of Consumer Marketing*	1.8	*Jnl of Product & Br & Management*	1.8
Environmental Management & Health [a]	1.8	*The TQM Magazine*	1.8	*The TQM Magazine*	1.8
Interlending & Document Supply [a]	1.5	*Marketing Intelligence & Planning*	1.7	*Jnl of Services Marketing*	1.7
OCLC Systems & Services [a]	1.2	*Jnl of Managerial Psychology*	1.7	*Managing Service Quality*	1.7
Per cent of use accounted by top 15	60	Per cent of use accounted by top 15	38	Per cent of use accounted by top 15	36

Note: [a] Journal of the Week title

just a different kind of user (lecturers rather than students for instance).

Comparing the titles in the lists of the two subscriber groups we can see that two at the top of the tree are the same, but otherwise there is much difference. The non-subscriber list is very different from the lists of the two groups of subscriber. In fact, the data in column one are skewed by a marketing activity called "Journal of the Week" which gives free access to two specific journals and should be read in this context. The journals offered free in June were as follows:

- Week 27-05-2002 – *Team Performance Management* and *Strategy & Leadership.*
- 05-06-2002 – *Employee Relations* and *International Journal of Public Sector Management.*
- 10-06-2002 – *Industrial and Commercial Training* and *Environmental Management and Health.*
- 17-06-2002 – *Interlending & Document Supply* and *Integrated Manufacturing Systems.*
- 24-06-2002 – *OCLC Systems & Services* and *Pigment Resin Technology.*

This marketing ploy is so effective that all but one of these titles (*Pigment Resin Technology*, which obviously has a very specialist readership) appears in the non-subscribers' list of the 15 most used titles (see Table VII).

The use of graphs – article, abstract and content page views – for each of the titles are shown in Figures 18-22.

Typically there is a big impact on the use of the journal as a result of the journal being available free because of the Journal of the Week promotion. On average, it increases use of the journal by over ten times. Digital journal users, like consumers everywhere, can spot a good deal when it comes their way, and are willing to change (in droves) their behaviour as a result.

Figure 23 shows the percentage use of all offer journals within their respective offer weeks, use of the same journals in all non-offer weeks and use of all other journals. Use of offer journals within the offer week make up about 12 per cent of use, the same journals in all non-offer weeks made up 6 per cent of use. Figure 24 shows the distribution between offer and non-offer journals by type of subscriber. As we might have expected offer journals were far more likely to be viewed by non-subscribers and trialists – 26 per cent of non-subscriber and trialist use was made up of views to a Journal of the Week title compared to about 2 per cent of Deal subscribers and 2 per cent of non-Deal subscribers.

In terms of article view time, Journal of the Week titles performed poorly compared to when they were not being offered and to non-offer journals. Table VIII gives article view time, broken down by views of Journals of the Week in the offer week, views to the same

Figure 18 *Team Performance Management* and *Strategy Leadership*

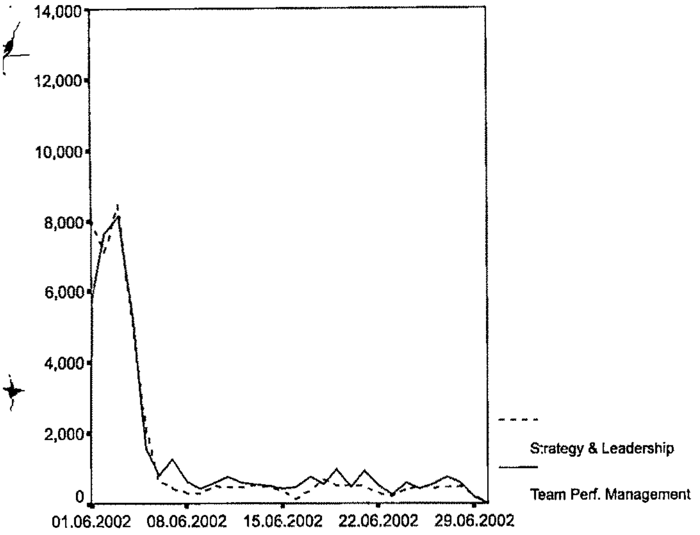


Figure 19 *Employee Relations* and *International Journal of Public Sector Management*

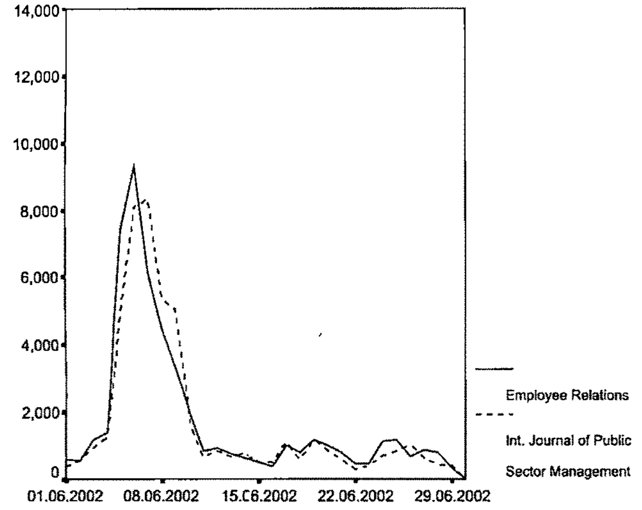


Figure 20 *Industrial and Commercial Training* and *Environmental Management and Health*

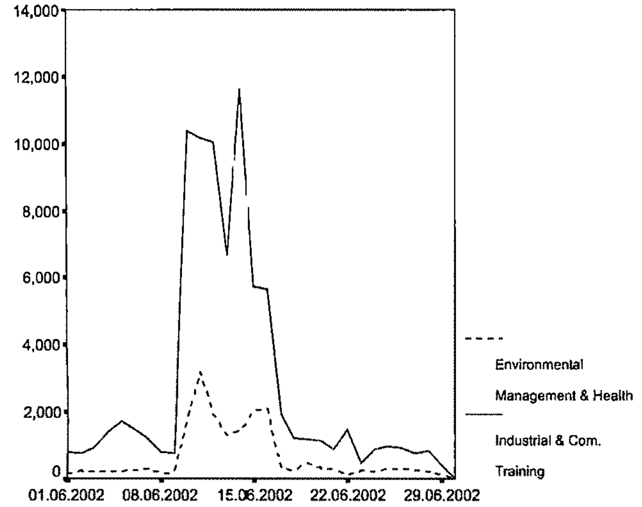


Figure 21 *Interlending and Document Supply* and *Integrated Manufacturing Systems*

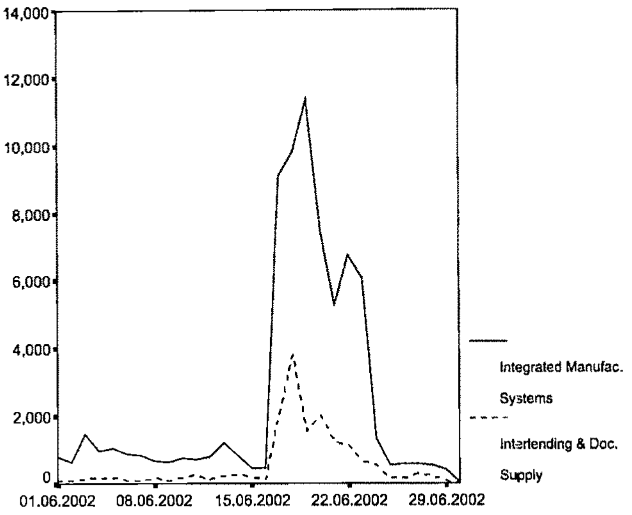


Figure 22 *OCLC Systems and Services* and *Pigment Resin Technology*

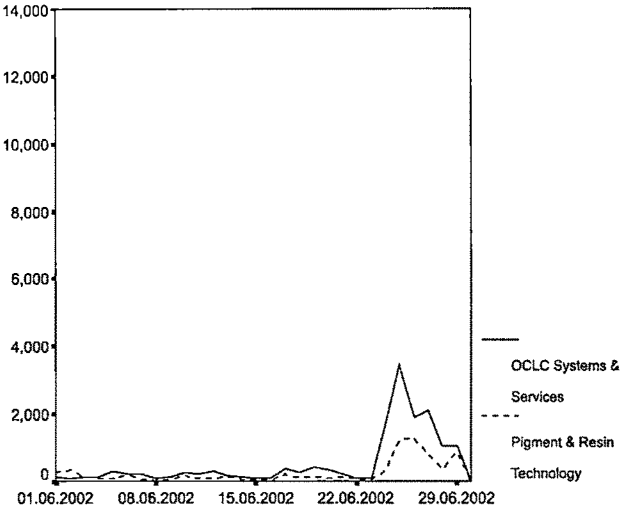


Figure 23 Impact of offer: ten journal offer weeks compared to non-offer weeks and non-offer journals use

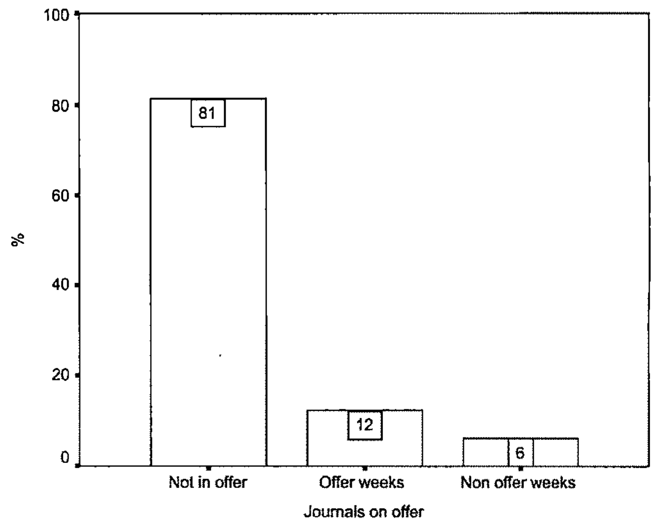
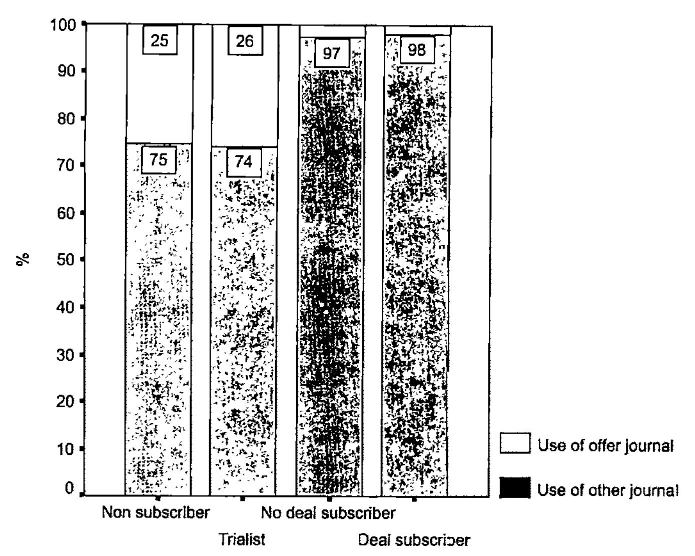


Figure 24 Distribution of Journal of the Week (article, abstract and content links) by type of subscriber



journals outside of the offer week and for non-offer journals. On average Journal of the Week articles within offer weeks were viewed for about 46 seconds (Huber's estimate) – less than half the view time recorded for the same journals viewed not in an offer week, and just about a third of the view time of all non-offer journal articles. This argues that, although the offer of the week does attract lots more use, much of this use is of a squirreling sort.

We can look at the use of journals from another perspective – by calculating how much time is spent "reading" them. Table IX shows the ranking of journals – the top and bottom ten – by article view time. There is approximately two and half minutes difference in page view time between the top (*Australian Journal of Hospitality Management*) and bottom journal (*Microelectronics International*).

Five of the bottom ten journals ranked by view time were Journal of the Week journals, which we know attract bouncer users who squirrel the data away. Furthermore, four of the top ten ranked by view time are only available in a PDF format. The longer page view time here is thought to result from users trying to read the PDF format online. This format is harder to read online and hence would attract a longer page view time. Differences in page view time seem to be related to the online format and if the journal comes under any offer – like the Journal of the Week offer. Other factors that might account for page view time difference are interest and size and make up of the journal.

Volumes/years of a journal consulted

The average number of back volumes viewed per journal was just under eight with more recent volumes being viewed the most. The range of volumes from which articles were downloaded was less than this and the average was about seven issues (6.7).

Of course, volume use tells us something about the age of material consulted, obsolescence etc. Given the fact that the archives on the Emerald archive seldom go back further than ten years, the data obtained will only be partial. However, it might be expected that with improved access to journal archives journal back numbers might increasingly be used, through improved exposure, etc.

Figures 25-27 show the distribution of articles used by year for three of the top performing journals by article use. The three journals are *Industrial and Commercial Training* (online from 1994-), *European Journal of Marketing* (1993-) and *Integrated Manufacturing Systems* (1994-). In terms of use, most use was made of the most recent years, with use for earlier volumes decaying over time. However, there was a marked difference between the three journals. The most recent two years made up about 27 per cent of use for the *European Journal of Marketing*. However, this percentage increased to 42 per cent and 47 per cent, respectively, for *Industrial and Commercial Training* and *Integrated Management Systems*, with the latter decaying fastest of all in use terms.

Figures 28 and 29 give the distribution of abstract, article and content back issue views

Table VIII Article view time by views of Journal of the Week in offer week, out of offer week and for non-offer journals

	Non-offer journals	Offer journals in offer weeks	Offer journals in non-offer weeks
Mean	486.6	215.6	401.6
Median	111.0	40.0	91.0
5 per cent trimmed	191.2	71.9	157.9
Huber's M-estimator	126.0	46.0	103.7

Table IX Top and bottom ten journals viewed ranked by view time

Top ten journals by page view time	Seconds	Bottom ten journals by page view time	Seconds
Australian Jnl of Hospitality Management [b]	288	*COMPEL: Int. J. Comput. & Maths in Electr.*	67
Records Management Jnl [b]	169	*Team Performance Management* [a]	66
Jnl of Documentation [b]	167	*Int Jnl of Public Sector Management* [a]	58
Jnl of Fashion Marketing Management [b]	154	*Integrated Manufacturing Systems* [a]	53
The Jnl of Business & Industrial Marketing	153	*Industrial & Commercial Training* [a]	53
Online Information Review	151	*Industrial Lubrication & Tribology*	48
Policing: An Int. Jnl of Police Strategies & Man't	151	*Environmental Management & Health* [a]	47
Int. Jnl of Service Industry Management	151	*Pigment & Resin Technology*	45
Jnl of Educational Administration	149	*Interlending & Document Supply*	44
Reference Services Review	149	*Microelelectronics Int.*	27

Notes: [a] Journal of the Week; [b] Only available in a PDF format

for the *European Journal of Marketing* broken down by type of subscriber. Again use of back issues decays with age of issue. The breakdown in use of back issues between subscriber type is proportionally the same and there is little evidence that Deal users use back issues more than non-Deal users and non-subscribers. However this needs to be confirmed by extending the analysis to other journals.

Figure 25 Number of articles viewed by year – *Industrial and Commercial Training* (1994-)

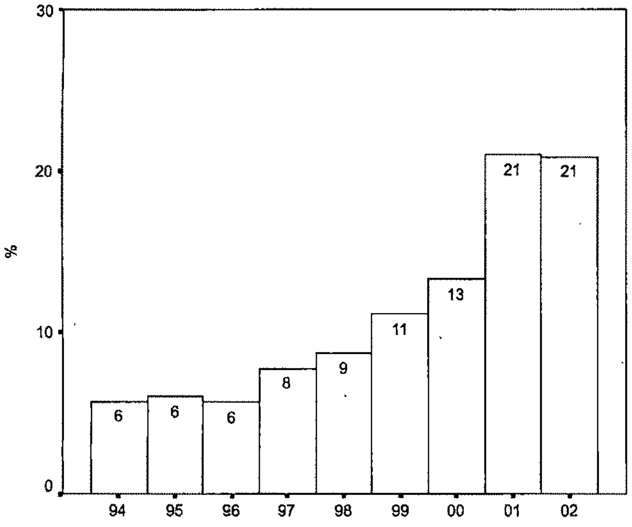


Figure 26 Number of articles viewed by year – *European Journal of Marketing* (1993-)

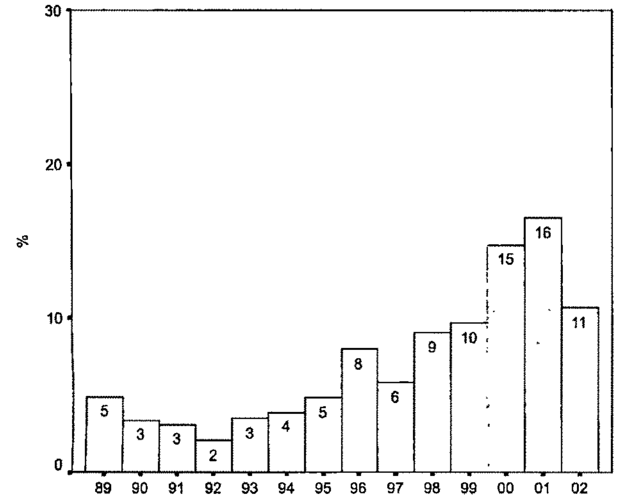


Figure 27 Number of articles viewed by year – *Integrated Manufacturing Systems* (1994-)

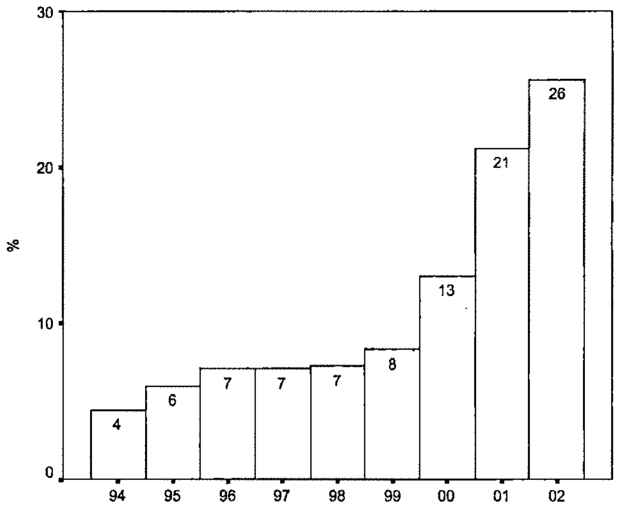


Figure 28 Abstract, article and content back issue views for the *European Journal of Marketing* broken down by type of subscriber

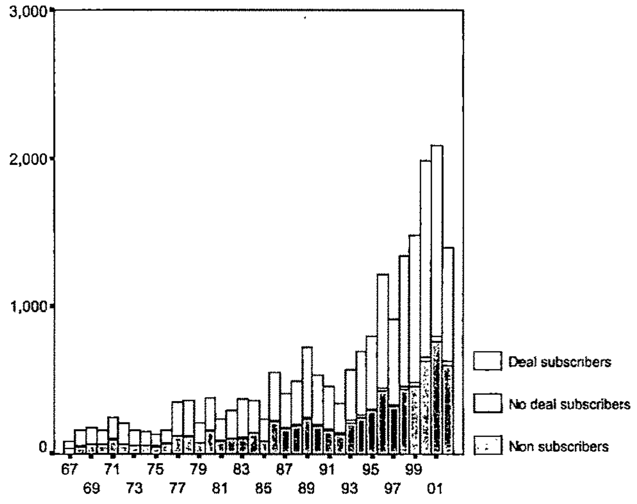
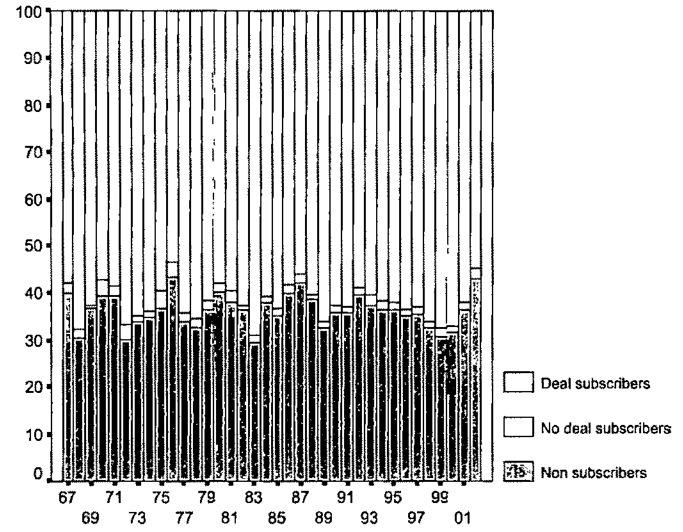


Figure 29 Abstract, article and content back issue views for the *European Journal of Marketing* broken down by type of subscriber as a percentage bar chart



Articles read by extent of journal archive

A relationship was found between the numbers of years for which the journal was available online and the number of articles requested. This is shown in Figure 30 and implies in part that journals with longer electronic archives perform better than new journals.

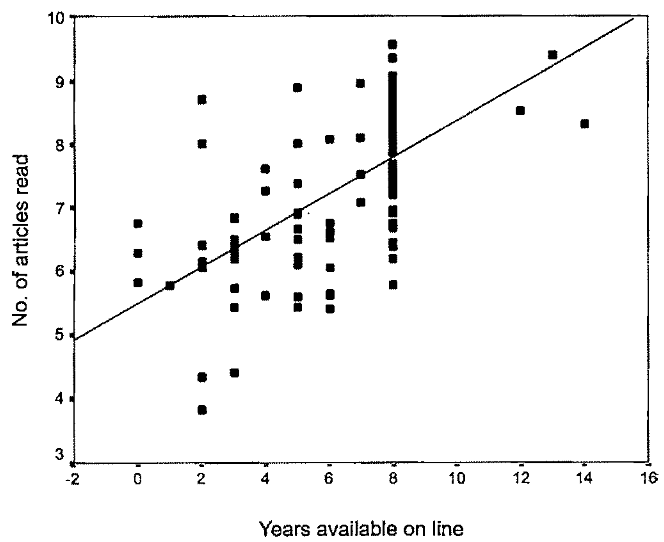
A number of factors are likely to impact on the number of articles requested. For example, the number of issues per year is likely to have an impact as well as age of the journal, and there may well be additional factors. A study of the variables found, for example, that the ratio of non-subscriber use to Deal subscriber use impacted on overall article use. Figure 31 explores this relationship. There is evidence of auto correlation[5]. However, it does seem that journals with a higher percentage of Deal subscribers' use also had a higher article use.

Subject analyses

Emerald classifies its business and information studies journals into 22 subject sub-categories – some journals belong to a number of categories. Figures 32 and 33, respectively, show for each category the average number of requests and article requests, and the average article view time. On average training journals recorded the highest number of requests and article requests but one of the lowest average page view times of just over a minute. Professional development journals recorded both a relatively high request score and a relatively high article view time score. Human resource management and hospitality management score well on the total number of requests. Library collection development scored highest on view time, more than twice the time for environmental management. There are real differences here that might be explained by length of article, size of journal and type of content.

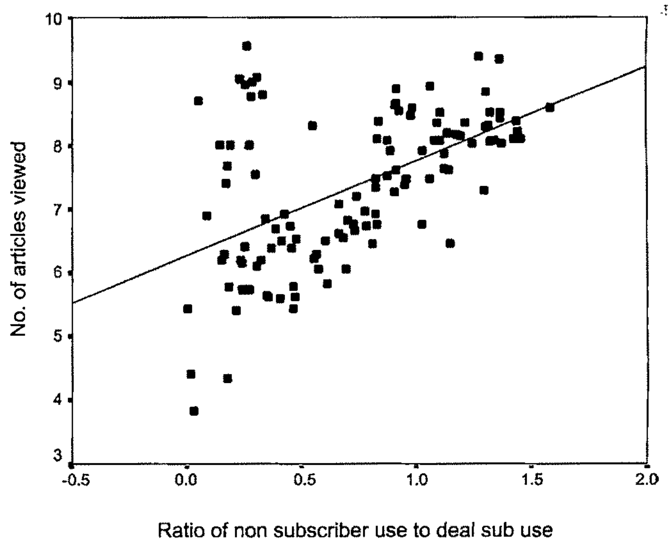
Figure 34 shows the number of different subjects viewed by type of subscriber. The data prove most interesting. Trial

Figure 30 Relationship between the number of articles requested and the number of years for which the journal is available online



Note: R = 0.62

Figure 31 Ratio of non-subscriber use to Deal subscriber use and the number (log) of articles read



Note: R = 0.53 $p < 0.000$

Figure 32 Average number of requests by subject category: all requests and article requests

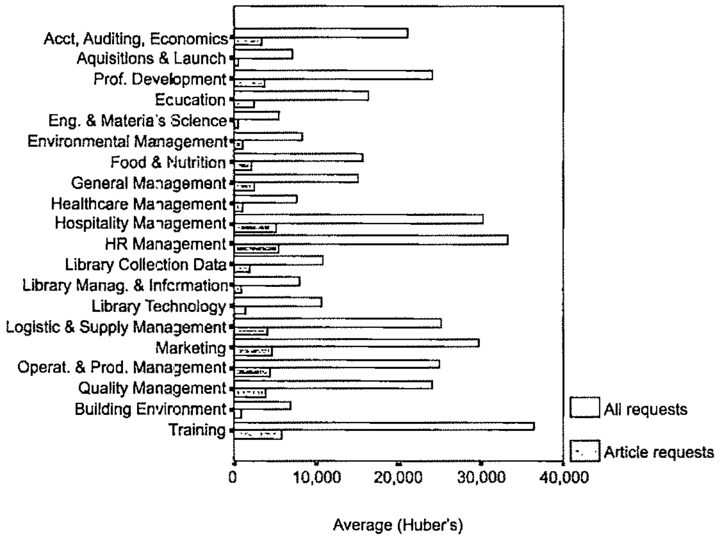


Figure 33 Average article view time by subject category – articles only

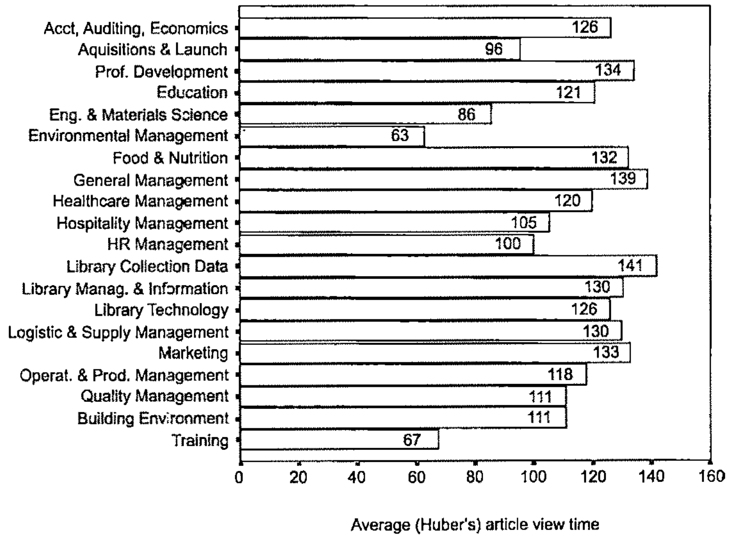
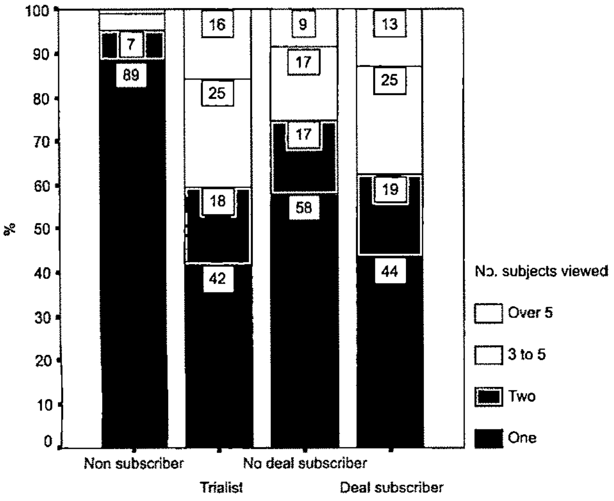


Figure 34 Number of different subjects viewed (article, abstract and content page requests) by subscriber type



subscribers typically only viewed one subject area: 89 per cent did so, compared to 56 per cent of Deal subscribers and 42 per cent of non-Deal subscribers who did so. There is a difference between Deal and non-Deal subscribers. Deal subscribers were more likely to view a greater number of different subject areas. Nearly one in three Deal users looked at journals from three or more subject categories, however this was only true of 26 per cent of non-Deal subscribers. Surprisingly, there was not a big difference between trialist and Deal subscriber subject use, and there appears no easy explanation for this. Further research needs to clarify if these users are searching journals using the search facility, as these users seem likely to look at more journals.

Viewing and downloading formats
The user's preference for viewing online or reading offline sparks many a discussion. On Emerald users can choose to view files either in a PDF or an HTML format. There are a number of reasons why users might prefer one format to another. Research students may prefer to print out a copy in the style of the original and may prefer that format to refer back to while others might wish to read it online or prefer the flexibility of viewing the article in an HTML format.

Users could in fact choose between four types of PDF format: to view the whole document in PDF (Doc PDF); to view a page in PDF (Page PDF); to view a directory in PDF (Dir PDF); and to view a file in PDF (File PDF). Approximately 10 per cent of journals were only available in a PDF format. This occurs as the decision to make a journal available in an HTML format is made after the decision to make available a journal in a PDF format. In total HTML made up 38 per cent of all views while PDF made up 62 per cent, however, the difference between documents viewed as PDF and HTML is much smaller: 40 per cent compared to 38 per cent (Figure 35).

Figure 36 provides the breakdown of choice of article view format by type of user (the figure excludes views to articles that could "only" be viewed in a PDF format). When given a choice as to what format to view an article less than half of Deal users (45 per cent) selected to view in an HTML format; this was only true of a quarter of non-Deal subscribers, a third of trialists and about a fifth of non-subscribers. It appears that, on average, non-subscribers and non-Deal subscribers prefer a PDF format, while Deal subscribers are more willing to select an HTML format. Perhaps Deal subscribers are more likely to be experienced IT users, are used to reading online and managing information in a digital format. It could be that people access HTML if they expect to scan but PDF if they expect to download, print out and keep. There is some evidence that even the most sophisticated academic community (astrophysicists) access PDF and print out to read or perhaps file (Boyce and Tenopir, 2002). Future research needs to verify this.

Figure 35 Distribution of format view PDF vs HTML

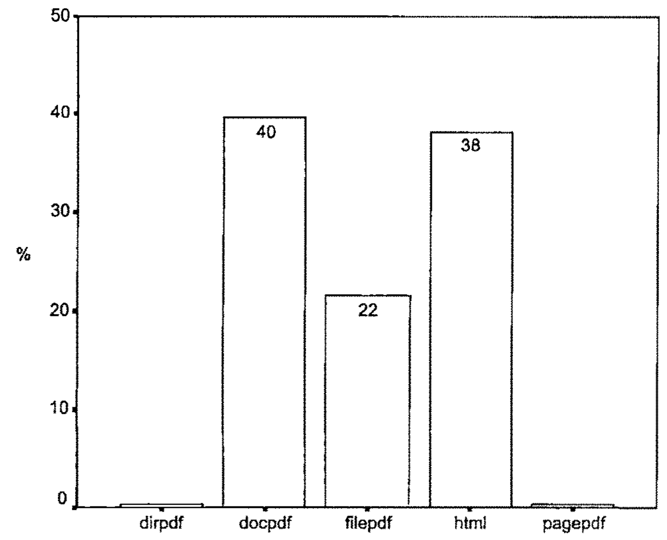
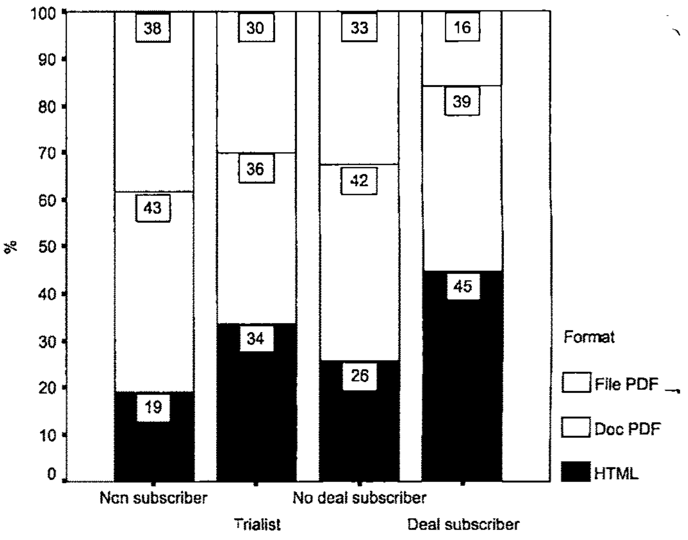


Figure 36 Format article view by type of subscriber



A difference in the download time between the formats was found. It took approximately seven times longer to download the same article in a PDF form compared to an HTML form: 14 seconds compared to two seconds. The PDF format delivers the article in the style of the published article and requires the client machine to have a PDF reader. The additional download time results from the client machine loading up the PDF reader and displaying the article. HTML requires no additional software other than the browser software that the user is currently using and there is no delay in loading an additional program.

Table X gives the view time comparing all articles, PDF views and HTML views. Although PDF files took longer to download, HTML files recorded a longer page view time by over half as much again compared to PDF views: 142 seconds to 94 seconds (Huber's M-estimate). PDF is actually more difficult to read on screen and although some users may

Table X View time comparing all articles with articles viewed in a PDF and HTML format

	All articles	PDF format	HTML format
Mean	444.2	390.0	534.9
Median	97	81	126.0
5 per cent trimmed	170.2	146.6	212.0
Huber's M-estimate	111.2	93.7	142.0

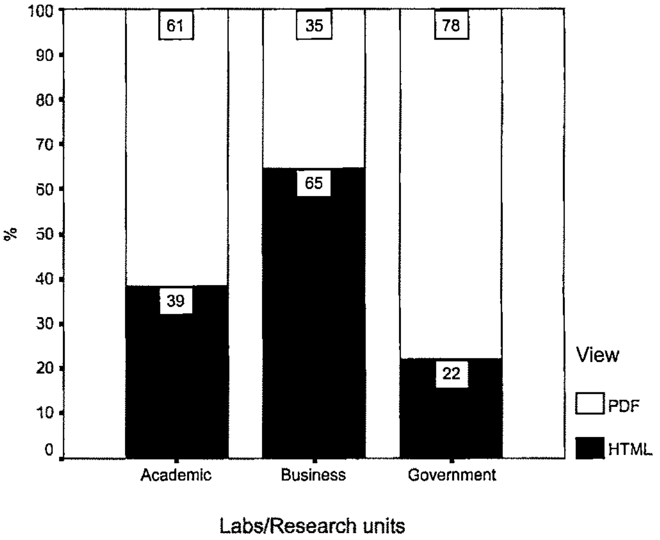
well be reading PDF on screen it seems more likely that PDF requested articles are being printed. HTML formatted articles are easier to read and manipulate on screen and although some users will print off on an HTML format it seems likely that users – those recording an above average HTML view time – are actually reading the article online. Experienced users will be selecting parts of the article to read while "skim" reading other parts.

Choice of format may well vary with institution. Users in some institutions – like a library – may well not be able to work "on-line" and hence opt to print out a PDF formatted file. Cost might also come into it – a PDF formatted file is likely to be cheaper to print than an HTML file as the PDF formatted file is usually displayed on fewer pages. Again further research is needed to clarify the impact, if any, of how people use each format and if institution and cost is an issue.

Earlier it was pointed out that Deal subscribers were more likely to request articles in an HTML format and we would expect those users to have a longer article page view time. It was found that Deal subscribers had approximately double the view time compared to non-Deal subscribers: 131 seconds compared to 67.1 seconds.

We might expect the variation in choice of format to vary with age of user, experience, type of research and characteristic of user organisation. We shall investigate age at a later date, but Figure 37 gives the breakdown of format choice of research or laboratory type users, by whether the research centre was commercial, educational, or government. All business research laboratories were non-Deal subscribers, while all academic and 95 per cent of government laboratories tended to be Deal subscribers.

Figure 37 View format by organisation type – research organisations only



For this small group of users, who accounted for about 0.1 per cent of use, business research users were more likely to view an article in an HTML format, 65 per cent of these users did so compared to 39 per cent of educational users and 22 per cent of government research users. Future qualitative research is needed to examine reasons for these differences.

Categorising users (and use) in other ways

Country and organisational affiliation of user. So far we have been looking at use in regard to subscriber type only, but it is possible to analyse use by country of origin, by type of organisation to which they are affiliated and by individual named institution. Figures 38 and 39, respectively, break down use by the country visitors came from and their organisation type, as indicated by their IP address. Almost half of use came via USA IP addresses and 20 per cent via UK ones. IP location addresses are renowned (Nicholas *et al.*, 1999) for being incorrect,

Figure 38 Percentage breakdown of use by country of IP address of user

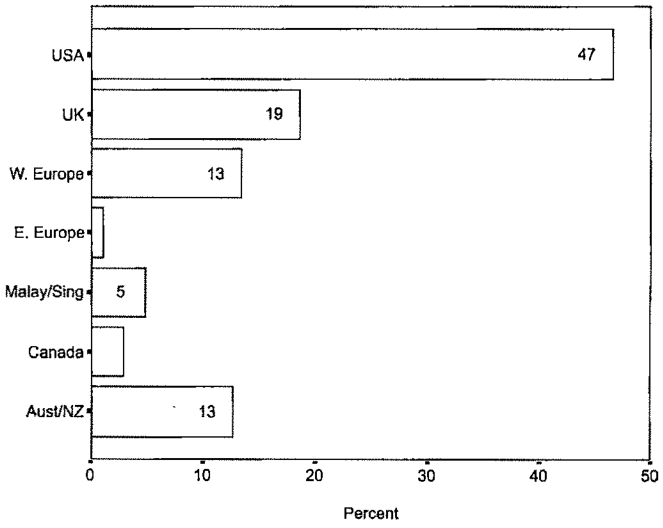
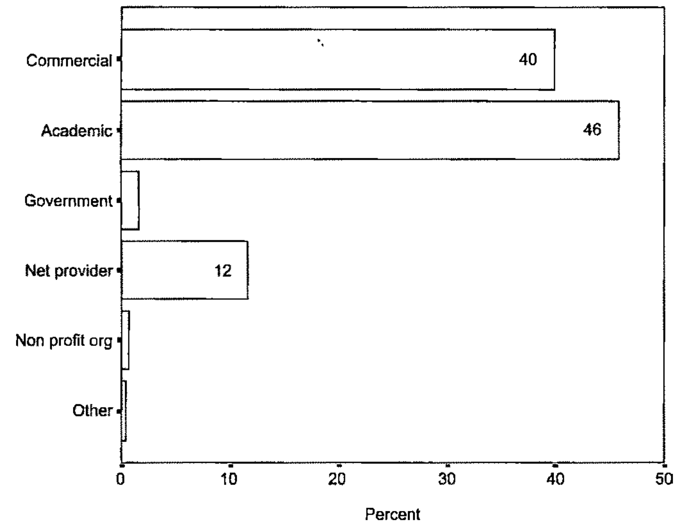


Figure 39 Percentage breakdown of use by organisation of IP address of user



as many UK users will have a USA domain name address. Thus we should compare these percentages to the known geographical distribution of Deal subscribers derived from address details rather than the IP number. Viewed this way less than 10 per cent of use by Deal subscribers came from the USA while 40 per cent from the UK, 18 per cent from Australasia and 17 per cent from the Far East. The understatement by IP location address occurs because many non-US organisations, mainly commercial and Net providers, prefer a USA registered IP address and these users will in fact come from other countries. However, the IP country location analysis is useful as location can be resolved for all users – non-subscribers, non-Deal subscribers as well as Deal subscribers and secondly the type of user organisation, which is also IP address specific, can also be analysed.

In total, 46 per cent of use was accounted for by people who accessed the site via an academic institution, 40 per cent via a commercial company and 12 per cent via a Net provider (home users, perhaps). Note – Net provider organisations generally prefer to register as a ".com" organisation and this use and Net use may well reflect use by individuals or small organisations. Just about seven in ten Deal subscriber use and eight in ten non-Deal subscriber use was identified as coming from academic institutions.

By way of contrast Figures 40 and 41 give the same information for users and as can be seen there is not a lot of difference between the breakdown between use and users by location and organisation type.

Figure 40 Percentage breakdown of user by country of IP address of user

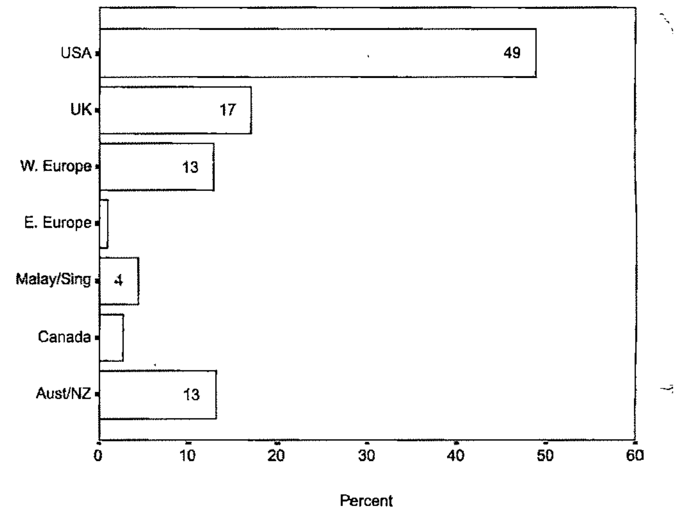
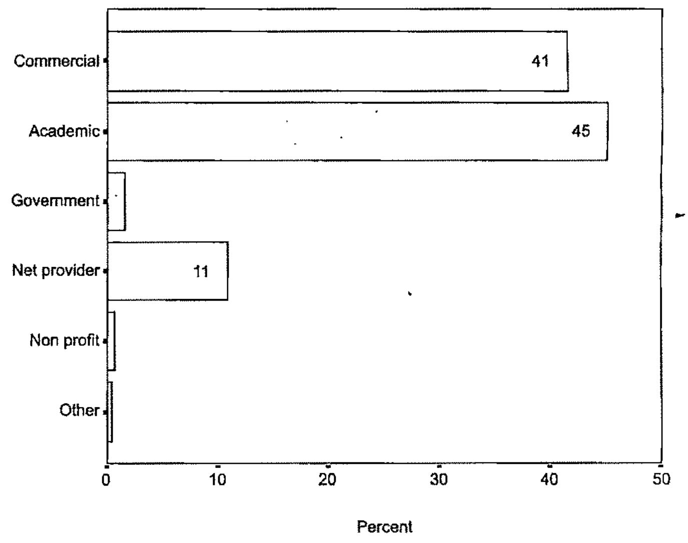


Figure 41 Percentage breakdown of user by organisation of IP address of use



In a cross-classification it was found that 85 per cent of commercial and 70 per cent of Net organisation use was also attributed to USA use. However, this is unlikely to be the case. Take, for example, the case of BTconnect.com, users accessing the Web via this provider would be classified as a USA commercial user while in fact they would be likely to be UK users accessing the Web via a Net provider.

We are more sure that accesses by academic organisations are by academic organisations. Just over a third of use (38 per cent) by academic organisation came via the UK, 27 per cent came via the USA, and 26 per cent came from academic institutions based in Australia and New Zealand.

Figure 42 shows use by the country visitors came from, as indicated by their IP address,

Figure 42 Site use by location of user by subscriber type

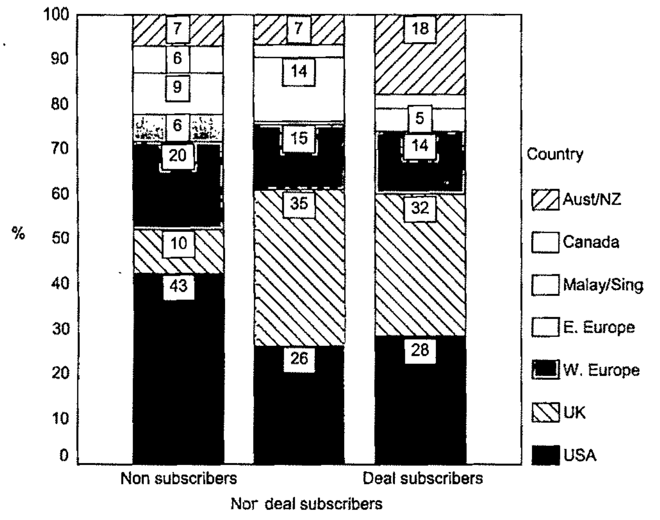
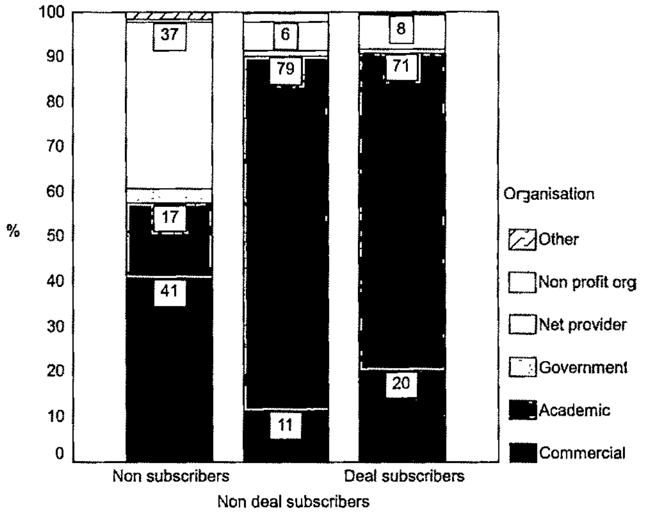


Figure 43 Site use of organisation affiliation of user by subscriber type



broken down by subscriber type. A higher proportion of non-subscriber use was identified as coming from the USA and Eastern Europe compared to Deal and non-Deal subscriber use and less non-subscriber (including trialists) use was identified as coming from the UK. Only 10 per cent of non-subscriber (including trialists) use originated from the UK, 43 per cent of use by this group came from the USA and 20 per cent from Eastern Europe. We might have expected the Eastern Europe figure on the grounds of cost and lack of resource, but the US figure is more puzzling. In comparison only 28 per cent of Deal subscriber use came from the USA and about 14 per cent from Eastern Europe. Most subscriber use, nearly a third, came from the UK. The high percentage coming from the USA probably reflects individual users accessing the Web via UK based Net provider organisations but having USA IP registered addresses. As can be seen (Figure 43) nearly eight in ten non-subscriber use was via commercial and Net provider IP identified organisations (note many Net providers will have a commercial IP address). We would expect home users to use an IP provider and these users are likely to be non-subscribers.

Looking at country more closely (Figure 43), Deal subscribers seem particularly strong in Australia and New Zealand, 18 per cent of users are identified as coming from Australia compared to 7 per cent of non-Deal subscribers and 7 per cent of non-subscribers (including trialists). A high proportion of non-Deal subscribers come from Malaysia and Singapore, while Canadian users seem surprisingly low though Canadians made up 10 per cent of all non-subscribers.

Conclusions

The Emerald data has proved very interesting. The Emerald service is open to virtually anyone with an interest. We can compare and contrast the behaviour of four distinct user groups – all with different levels of access and we are beginning to shed light on the question "Do people with access to more journals have fundamentally different information seeking patterns as evidenced by the logs". Of course, as yet, we do not know whether these people are part of the Big Deals of other publishers.

It is too early to make any hard conclusions, but it is plain that much of this deep log data is unique and that publishers and participating libraries (never mind users) have not seen the like of what we are attempting to do.

To recap on our early findings:

- There is a lot of site activity. There were approximately 208 people using the system per hour. They made an average of 3,077 requests of which 475 were article requests.
- Non-subscribers accounted for 45 per cent of abstract requests, but just 37 per cent of article requests.
- Articles recorded the longest view time of just less than two minutes; abstract view time was about a quarter of this and was just over half a minute. View time here may well be the time the user spends scanning the document.

- Subscribers were the more frequent visitors. A total of 19 per cent of subscribers visited the site two or more times in June but this was only true of 4 per cent of non-subscribers.
- Deal subscribers differed from non-Deal subscribers in that they had a longer article view time, viewed more journals and viewed a greater number of journals from different subjects.
- Trialists proved to be active users of the site.
- Nearly eight in ten of non-subscriber use was via commercial and Net provider IP identified organisations (many of these now have commercial registered IP addresses). We would expect home users to come in via a Net provider and to be non-subscribers.
- Some of the biggest visitors were not users as such but robots that index the Net, Net providers and machines that cache site content. It would be sensible for Big Deal vendors to adopt a robot excluding convention.
- Big Deal users take advantage of the greater choice on offer. On average during the one-month survey period non-Deal subscribers viewed about five different journals and on average requested about 12 articles. While those institutions subscribing to the Big Deal viewed approximately 46 different journals and requested about 93 articles. Another way of looking at it is that Big Deal users were more likely to view two or more journals, 57 per cent did so compared to about 30 per cent of non-subscribers and non-Deal subscribers.
- Users chose to view articles in an HTML format 38 per cent of the time. Deal subscribers were more likely to view articles in an HTML format. The shorter view time of PDF suggests that users are printing off with PDF and scan reading with HTML.

Ironically, while we sought to shed light on the Big Deal users and what resulted from the greater choices open to them, probably the most interesting data to emerge concerns trialists. This shows clearly that user behaviour can be easily manipulated through the use of commercial incentives – incentives all consumers, online and offline, are familiar with.

Finally, a word of caution – "hits" data should not be used to define academic behaviour until we know more. Thus, in the print environment we know that the main users of library facilities are students and it is likely that the main users of e-journals are students too. The implications are significant. For example, whereas it is likely that an academic will have a view on the relative reliability or authority of journals, students (even graduate students) are thought not to have such a view and they may well just be using key words to determine which journals they use. Also it could be that Emerald data is biased towards management and library scientists who are very much practitioners on the whole or close to practitioners. They may well have a different approach to (say) historians or theoretical social scientists like anthropologists.

Notes

1 The Web, the kiosk, digital TV and the changing and evolving face of consumer health information provision: a national impact study, Department of Health, 2000-2002; Web log analysis: case study newspapers, News International, 1998-1999.
2 Project funded by the Ingenta Institute, July-December 2002.
3 Although change is not guaranteed as Boyce and Tenopir have (2002) found in regard to the claims of physicists, that by now no one would be printing out to read but would read on screen. This has not come to pass yet.
4 Historically, in fact, Internet hits were the count of all downloads – i.e. the total number of the multiple elements of a "page"; then the practice changed with hits resolved to pages by excluding multiple elements.
5 Information of the dependent variable is also part of the independent term – in this case the independent term is the dependent term broken up into two variables and expressed as a ratio.

References

Boyce, P. and Tenopir, C. (2002), *AAS Survey of Astronomy Information Use*, available at: www.web.utk.edu/~tenopir/AAS_Survey.html (accessed 28 October 2002).

Davis, P.M. (2002), "Patterns in electronic journal usage: challenging the composition of geographic consortia", *College & Research Libraries*, November.

King, D. (2002), *Library Consortia and Electronic Journal Services*, The Ingenta Institute, Oxford.

Kohl, D. (2002), "Learning from our experiments: the remarkable implications of OhioLINK and HEAL-Link electronic use data for collection development", in

Management in Academic Libraries (*Conference Proceedings*), University of Macedonia, Thessaloniki, pp. 27-34.

Mabe, M. (2002), *OhioLink Statistics*, e-mail to the authors, 2 September.

Mercer. L. (2000), "Measuring the use and value of electronic journals and books", *Issues in Science and Technology Librarianship*, Winter, available at: www.library.ucsb.edu/ist1/00-winter/article1.html

Montgomery, C. (2000), "Measuring the impact of an electronic journal collection on library costs: a framework and preliminary observations", *D-Lib Magazine*, Vol. 10 No. 6, available at: www.dlib.org/dlib/october00/montgomery/10montgomery.html

Nicholas, D., Huntington, P. and Williams, P. (2001a), "Establishing metrics for the evaluation of touch-screen kiosks", *Journal of Information Science*, Vol. 27 No. 2, pp. 61-72.

Nicholas, D., Huntington, P. and Williams, P. (2001b), "Comparing Web and touch-screen transaction log files", *Journal of Medical Internet Research*, Vol. 3 No. 2, September, e18, available at: www.jmir.org/2001/2/e18/

Nicholas, D., Huntington, P. and Williams, P. (2002a), "Evaluating metrics for comparing the use of Web sites: case study two consumer health web sites", *Journal of Information Science*, Vol. 28 No. 1, pp. 63-75.

Nicholas, D., Huntington, P. and Williams, P. (2002b), "The impact of location on the use of digital information systems: case study health information kiosks", *Journal of Documentation*, Vol. 58 No. 3, pp. 284-301.

Nicholas, D., Huntington, P., Williams, P., Lievesley, N. and Withey, R. (1999), "Developing and testing methods to determine the use of web sites: case study newspapers", *Aslib Proceedings*, Vol. 51 No. 5, pp. 144-54.

Pullinger, D. and Baldwin, C. (2002), *Electronic Journals and User Behaviour*, Deedot Press, Cambridge.

Sanville, T. as quoted in Watkinson, A. (2002), "Big Deal research 2002: scoping of statistical analysis", Ingenta Institute, Oxford, unpublished report.

Watkinson, A. (2002), "Big Deal research 2002: scoping of statistical analysis", Ingenta Institute, Oxford, unpublished report.

Note from the publisher

Emerald Fulltext 2003 launched

We are pleased to announce the launch of the latest version of Emerald Fulltext, providing even more sophisticated, online access to leading management and LIS journals.

Emerald Fulltext 2003 delivers more journals than ever before. The addition of 16 new titles brings the total number of titles delivered by Emerald Fulltext to a market leading 158. The total archive of articles is now over 40,000.

The 2003 release incorporates a host of new features designed to make user searches even more effective. Users will now be able to specify the journals they wish to be included in a search and then refine that search by adding or removing journals. Searching is now also supported by comprehensive context-sensitive help. There is also a re-designed interface, with hyperlinks to all new help pages. Once a search is complete, a new "search result customisation feature" empowers users to select those articles from within the results that they wish to receive by e-mail.

Another significant usability feature, aimed at encouraging users to exploit Emerald Fulltext 2003 to the full, is a highly intuitive browse menu. Through the extensive use of clearly defined options, the in-depth browsing of journals is now both simple and straightforward.

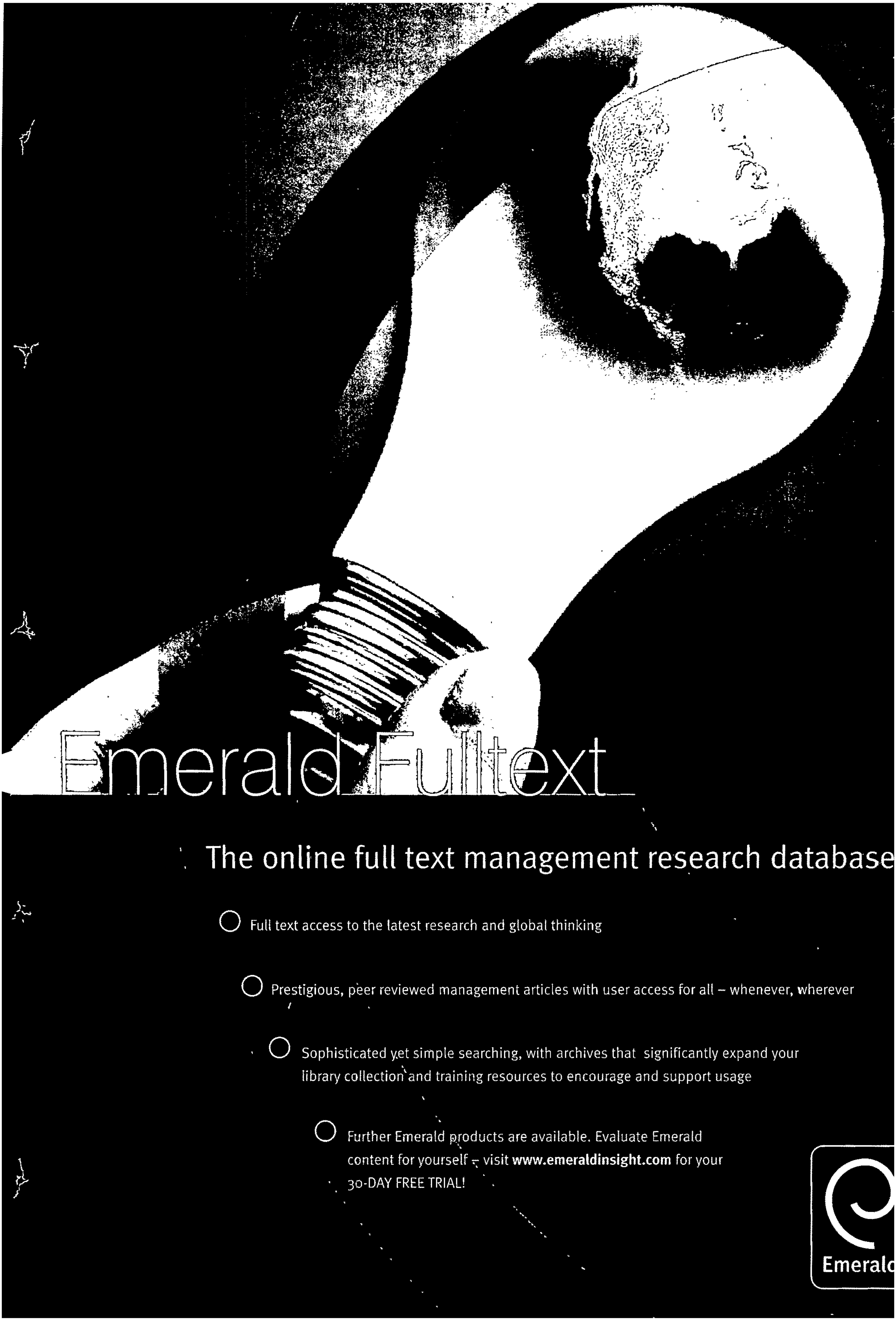
Amongst the key features are user definable subject search alerts. These empower users to define specific areas of interest, to which they will be alerted whenever work in that area is published. Easily updateable, this new feature will keep even the most demanding researcher abreast of all newly published work in their particular area of specialisation.

Emerald Fulltext 2003 can also identify special issues of journals, where the journal focuses on a particular subject, making them easier for the user to identify and select.

Administrators of Emerald Fulltext 2003 are now able to set the parameters of all user searches to include only a pre-specified set of journals, for example, according to an organisation's particular focus or access policy.

Emerald Fulltext 2003 is available for trial by clicking the "try" button on the www.emeraldinsight.com home page.

Aslib Proceedings: New Information Perspectives
Volume 55 · Number 1/2 · 2003 · p. 110
© MCB UP Limited · ISSN 0001-253X



Emerald Fulltext

The online full text management research database

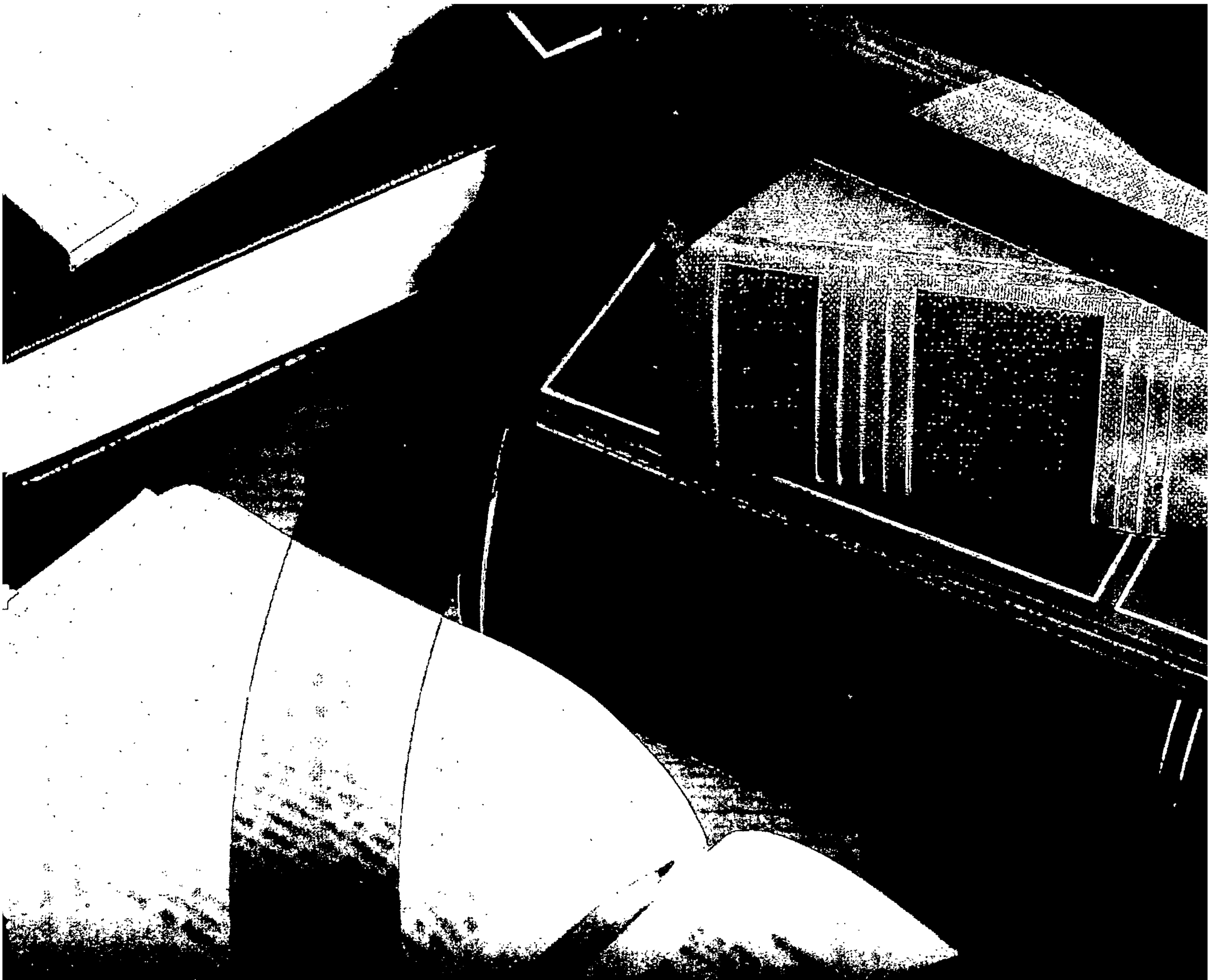
○ Full text access to the latest research and global thinking

○ Prestigious, peer reviewed management articles with user access for all – whenever, wherever

○ Sophisticated yet simple searching, with archives that significantly expand your library collection and training resources to encourage and support usage

○ Further Emerald products are available. Evaluate Emerald content for yourself – visit **www.emeraldinsight.com** for your 30-DAY FREE TRIAL!

Emeral



The Emerald Research Register

Bringing research to the wider community

○ The Emerald Research Register provides an online forum for the circulation of pre-publication information on research studies in management and related fields worldwide

○ Open to all, the Emerald Research Register provides a meeting place for researchers to find collaborators for their research projects

○ The Emerald Research Register facilitates the sharing of information with other researchers in similar and different fields

○ Selected abstracts will be published in one or more of our journals, as we are committed to linking research work in progress to editors and publishers

○ We aim to help researchers gain advanced recognition among their peers by publicising their work at the earliest possible opportunity

For further information please contact the Research Register Editor at **rreditor@emeraldinsight.com**

Notes for contributors

Aslib Proceedings: New Information Perspectives

Copyright

Articles submitted to the journal should be original contributions and should not be under consideration for any other publication at the same time. Authors submitting articles for publication warrant that the work is not an infringement of any existing **copyright** and will indemnify the publisher against any breach of such warranty. For ease of dissemination and to ensure proper policing of use, papers and contributions become the legal copyright of the publisher unless otherwise agreed. Articles should be submitted by e-mail or on disc to:

The Editor
Professor David Nicholas, Head of Department,
Department of Information Science, City University,
Northampton Square, London EC1V 0HB, UK.
E-mail: nicky@soi.city.ac.uk

Editorial objectives

Aslib Proceedings: New Information Perspectives brings currency, authority and accessibility to the reporting of current research, issues and debates in the broad area of information work. Above all, the journal wishes to provide research and comment in a form that is easily and quickly understood: a fresh, rigorous, but unfussy, writing style is what is aimed for. The needs of busy practitioners (and academics) are very much in mind. Articles are refereed to meet the need for accredited and authoritative information. To ensure that this does not result in an unacceptable loss of currency, articles are speedily refereed by the journal's large, eminent and multi-disciplinary Editorial Board (assembled for just such a purpose). In some cases they may be referred to an external panel of consultants. The submission of research in progress articles is encouraged.

Final submission checklist

- Accurate, checked hard copy
- Abstracts and keywords
- Correct, complete Harvard references
- Figures and illustrations in electronic and hard copy form
- Text on labelled disk or CD-ROM or as attached file if requested by editor
- Completed/signed journal article record form

The boundaries of information work are rapidly changing and widening. *Aslib Proceedings* has a role to play in the repositioning of the information profession by encouraging submissions from information managers, providers, packagers and consumers of all kinds – and especially those from the related fields of journalism, electronic publishing, communication and Internet studies.

Manuscript requirements

As a guide, articles should be between 2,000 and 8,000 words in **length.** A **title** of not more than eight words should be provided. A brief **autobiographical note** should be supplied including full name, affiliation, e-mail address and full international contact details. Authors must supply an **abstract** of 100-150 words. Up to six **keywords** should be included which encapsulate the principal subjects covered by the article.

Where there is a **methodology**, it should be clearly described under a separate heading. **Headings** must be short, clearly defined and not numbered. **Notes** or **Endnotes** should be used only if absolutely necessary and must be identified in the text by consecutive numbers, enclosed in square brackets and listed at the end of the article.

All **Figures** (charts, diagrams and line drawings) and **Plates** (photographic images) should be submitted in both electronic form and hard copy originals. Figures should be of clear quality, black and white and numbered consecutively with arabic numerals.

Electronic figures should be either copied and pasted or saved and imported from the origination software into a blank Microsoft Word document. Figures created in MS Powerpoint are also acceptable. Acceptable standard image formats are: .eps, .pdf, .ai and .wmf. If you are unable to supply graphics in these formats then please ensure they are .tif, .jpeg, .bmp, .pcx, .pic, .gif or .pct at a resolution of at least 300dpi and at least 10cm wide. To prepare **screenshots** simultaneously press the "Alt" and "Print screen" keys on the keyboard, open a blank Microsoft Word document and simultaneously press "Ctrl" and "V" to paste the image. (Capture all the contents/windows on the computer screen to paste into MS Word, by simultaneously pressing "Ctrl" and "Print screen".)

For photographic images (plates) good quality original photographs should be submitted. If supplied electronically they should be saved as .tif or .jpeg files at a resolution of at least 300dpi and at least 10cm wide. Digital camera settings should be set at the highest resolution/quality as possible.

In the text of the paper the preferred position of all figures and plates should be indicated by typing on a separate line the words "Take in Figure (No.)" or "Take in Plate (No.)". Supply succinct and clear captions for all figures and plates.

Tables must be numbered consecutively with roman numerals and a brief title. In the text, the position of the table should be shown by typing on a separate line the words "Take in Table IV".

References to other publications must be in Harvard style and carefully checked for completeness, accuracy and consistency. This is very important in an electronic environment because it enables your readers to exploit the Reference Linking facility on the database and link back to the works you have cited through CrossRef. You should include all author names and initials and give any journal title in full.

You should cite publications in the text: (Adams, 1997) using the first named author's name. At the end of the paper a reference list in alphabetical order should be supplied:

For books: surname, initials, (year), *title of book*, publisher, place of publication, e.g. Fallbright, A. and Khan, G. (2001), *Competing Strategies*, Outhouse Press, Rochester.

For book chapters: surname, initials, (year), "chapter title", editor's surname, initials, *title of book*, publisher, place of publication, pages, e.g. Bessley, M. and Wilson, P. (1999), "Marketing for the production manager", in Levicki, J. (Ed.), *Taking the Blinkers off Managers*, Broom Relm, London, pp.29-33.

For journals: surname, initials, (year), "title of article", *journal name*, volume, number, pages, e.g. Greenwald, E. (2000), "Empowered to serve", *Management Decision*, Vol. 33 No. 5, pp. 6-10.

For electronic sources: if available online the full URL should be supplied at the end of the reference.

Final submission of the article

Once accepted for publication, the final version of the manuscript must be provided, accompanied by a 3.5" **disk, Zip disk** or **CD-ROM** of the same version labelled with: disk format (Macintosh or PC); author name(s); title of article; journal title; file name.

Alternatively, the editor may request the final version as an attached file to an e-mail.

Each article must be accompanied by a completed and signed **Journal Article Record Form** available from the Editor or on http://www.emeraldinsight.com/literaticlub/jarforms.htm

The manuscript will be considered to be the definitive version of the article. The author must ensure that it is complete, grammatically correct and without spelling or typographical errors.

In preparing the disk, please use one of the following preferred formats: Word, Word Perfect, Rich text format or TeX/LaTeX.

Technical assistance is available from Emerald's Literati Club on http://www.emeraldinsight.com/literaticlub or by contacting Mike Massey at Emerald, e-mail: mmassey@emeraldinsight.com

Aslib Proceedings

New Information Perspectives

Volume 55 Number 1/2 2003
In 2003 this journal will consist of 6 printed issues delivered in 5 despatches
+ Internet Online Publishing with Archive, Active Reference Linking, Emerald WIRE, Key Readings,
Research Register, Non-article Content, Institution-wide Licence, E-mail Alerting Service and Usage Statistics

Contents

Number 1/2

Knowledge production, consumption and impact: policy indicators for a changing world

Guest Editor: Dr Ian Rowlands

2 Access this journal online

3 Abstracts & keywords

5 Knowledge production, consumption and impact: policy indicators for a changing world
Ian Rowlands

13 Information metrics and user studies
Carol Tenopir

18 (Mis)understanding the digital media revolution
Richard Withey

23 Digital information consumers, players and purchasers: information seeking behaviour in the new digital interactive environment
David Nicholas, Tom Dobrowolski, Richard Withey, Chris Russell, Paul Huntington and Peter Williams

32 Beyond outputs: new measures of biomedical research impact
Grant Lewison

43 Digital information provision via interactive television: understanding the digital consumer
Barrie Gunter

52 Comparing the use of two DiTV transmission services: same service, different outcomes
Paul Huntington, David Nicholas and Peter Williams

64 Home electronic health information for the consumer: user evaluation of a DiTV video-on-demand service
Peter Williams, David Nicholas and Paul Huntington

75 Modelling the diffusion of specialised knowledge
Julian Warner

84 Digital journals, Big Deals and online searching behaviour: a pilot study
David Nicholas, Paul Huntington and Anthony Watkinson

110 Note from the publisher

Emerald
www.emeraldinsight.com

Aslib Proceedings

New Information Perspectives

Library Link

www.emeraldinsight.com/librarylink

Aslib imi
INFORMATION MANAGEMENT

Emerald

www.emeraldinsight.com

Aslib Proceedings: New Information Perspectives
ISSN 0001-253X
©2003 MCB UP Limited

Aslib Proceedings: New Information Perspectives is a refereed journal of international repute that brings currency, authority and accessibility to the reporting of research, issues and debates in the broad area of information work.

Aslib Proceedings: New Information Perspectives is published in association with Aslib, The Association for Information Management.

Editor Professor David Nicholas
Head of Department, Department of Information Science, City University, Northampton Square, London EC1V 0HB, UK. E-mail: nicky@soi.city.ac.uk
Deputy Editor Dr Ian Rowlands
Senior Lecturer, Department of Information Science, City University, London, UK
Editorial Manager Kay Nicholas
Research Administrator, Digital Consumer Health Research Project, Department of Information Science, City University, London, UK
Editorial Assistants Peter Williams
Research Fellow, Department of Information Science, City University, London, UK
Paul Huntington
Research Fellow, Department of Information Science, City University, London, UK
Managing Editor Diane Heath

Editorial Board
Ralph Adam
Freelance Journalist, City University, London, UK
John Akeroyd
Director, Learning Resources, South Bank University, London, UK
Peter Chapman
Information Consultant, Banbury, UK
Professor Peter Cole
Head of Department, Department of Journalism, University of Sheffield, UK
Dr Tom Dobrowolski
Senior Lecturer, Institute of Information Science and the Book, University of Warsaw, Poland
Harry East
Honorary Research Fellow, Department of Information Science, City University, London, UK
Professor David Ellis
Research Director, Department of Information and Library Studies, University of Wales, Aberystwyth, UK
Professor Ben Fouche
Head of Department, Department of Information Science, Stellenbosch University, Matieland, South Africa
Eti Herman
Vice-Director, Library, University of Haifa, Israel
Robin Hunt
Senior Vice President, Sterling Group, New York, USA
Nat Lievesley
Network Manager, Centre for Policy on Ageing, London, UK
Helen Martin
Information Manager, Research and Information Unit, The Guardian, *London, UK*
Anthony Watkinson
Publishing Consultant, Oxford, UK
Richard Withey
Director, Independent Digital, London, UK

This journal is also available online at www.emeraldinsight.com/ap.htm

Internet services available worldwide on URL www.emeraldinsight.com

Emerald
60/62 Toller Lane, Bradford,
West Yorkshire, England BD8 9BY
Tel +44 (0) 1274 777700
Fax +44 (0) 1274 785200
E-mail **help@emeraldinsight.com**

INVESTOR IN PEOPLE

Aslib Proceedings: New Information Perspectives is one of the 21 titles published in the field of Library and Information services that support Library Link. Library Link is a world-wide network that revolves around an Internet forum. Its remit is to be a valuable free resource to librarians. This includes providing detailed information on current issues within the field of Library and Information services and putting members in touch with like-minded individuals world-wide.
To become a member, access the Library Link Internet site at:
http://www.emeraldinsight.com/librarylink
Other titles published by Emerald in the field and featured at the Library Link site are: *The Bottom Line: Managing Library Finances, Campus-Wide Information Systems, Collection Building, The Electronic Library, Forthcoming International Scientific and Technical Conferences, Interlending & Document Supply, Internet Research, Journal of Documentation, Library Management, Library Hi Tech, Library HiTech News, Library Review, New Library World, OCLC Systems & Services, Online Information Review, Performance Measurement and Metrics, Program: electronic library and information systems, Records Management Journal, Reference Reviews, and Reference Service Reviews.*

ISOQAR QUALITY ASSURED FIRM ISO 9002
UKAS QUALITY MANAGEMENT 026
Certificate number ...[illegible]........

Pre-press activities, comprising origination and pagination, associated with the publication of management journals

Regional offices:

For North America
Emerald, 44 Brattle Street, 4th Floor,
Cambridge, MA 02138, USA
Tel Toll free +1 888 622 0075; Fax +1 617 354 6875
E-mail **america@emeraldinsight.com**

For Japan
Emerald, Reina 308, 5-1 Sakae-cho, Kanagawa-ku,
Yokohama City, Kanagawa Prefecture, 221-0052 Japan
Tel +81 45 444 0388; Fax +81 45 444 0389
E-mail **japan@emeraldinsight.com**

For Asia Pacific
Emerald, 7-2, 7th Floor, Menara KLH, Bandar Puchong Jaya,
47100 Puchong, Selangor, Malaysia
Tel +60 3 8076 6009; Fax +60 3 8076 6007
E-mail **asiapacific@emeraldinsight.com**

Contact details
Customer helpdesk:
Tel +44 (0) 1274 785278; Fax +44 (0) 1274 785204;
E-mail **support@emeraldinsight.com**
Orders, subscription and missing claims enquiries:
Tel +44 (0) 1274 777700; Fax +44 (0) 1274 785200

Reprint service enquiries:
Carole Noble, Bradford
E-mail **cnoble@emeraldinsight.com**

Copyright permissions:
Charles Parker, Bradford
E-mail **cparker@emeraldinsight.com**

Missing issue claims will be fulfilled if claimed within four months of date of despatch. Maximum of one claim per issue.

No part of this journal may be reproduced, stored in a retrieval system, transmitted in any form or by any means electronic, mechanical, photocopying, recording or otherwise without either the prior written permission of the publisher or a licence permitting restricted copying issued in the UK by The Copyright Licensing Agency and in the USA by The Copyright Clearance Center. No responsibility is accepted for the accuracy of information contained in the text, illustrations or advertisements. The opinions expressed in the articles are not necessarily those of the Editor or the publisher.

Emerald is a trading name of MCB UP Limited

Printed by Printhaus Group Ltd, Scirocco Close,
Moulton Park, Northampton NN3 6HE

Aslib Proceedings: New Information Perspectives

Volume 55, Number 3, 2003 ISSN 0001-253X

Contents

114 Access this journal online

115 Abstracts & keywords

117 **Knowledge sharing: a game people play**
Alton Chua

130 **Accountability and demonstration of the value of information services in South African law firms**
Olwyn Garratt and Adeline du Toit

138 **First steps towards providing the UK with health care information and advice via their television sets: an evaluation of four Department of Health sponsored pilot services**
David Nicholas, Paul Huntington, Peter Williams and Barrie Gunter

155 **Library portal solutions**
Andrew Cox and Robin Yeates

166 **E-mail overload in the UK workplace**
Jenni Ingham

181 **After the disaster: drawing up the insurance claim**
Robert Howes

Access this journal electronically

The current and past volumes of this journal are available at

www.emeraldinsight.com/ft

You can access over 100 additional Emerald journals, each with a comprehensive searchable archive of articles (many dating back to 1989), a detailed classification system and links to referenced material.

See page following contents for full details of what your access includes.

Emerald

Access this journal online

www.emeraldinsight.com/ap.htm

As a subscriber to this journal, you can benefit from instant, electronic access to the content of this title. Your access includes a variety of features that increase the value of your journal subscription.

Automatic permission to make up to 25 copies of individual articles

This facility can be used for teaching purposes, training courses, meetings or seminars. This only applies to articles of which Emerald owns copyright. For further details visit **www.emeraldinsight.com/copyright**

How to access this journal electronically

To benefit from electronic access to this journal you first need to register on the Internet. Registration is simple and full instructions are available online at **www.emeraldinsight.com/register** Once completed, your institution will have instant access to the journal content from **www.emeraldinsight.com** or via the journal homepage **www.emeraldinsight.com/ap.htm**

Our liberal institution-wide licence allows everyone within your institution to access your journal electronically, thus making your subscription more cost-effective. Our Web site has been designed to provide you with a comprehensive, simple system that needs only minimum administration. Access is available via IP authentication or username and password.

Key features of Emerald electronic journals

Online Publishing and Archiving
You can gain access to past volumes as well as new material from this journal on the Internet via Emerald Fulltext. You can browse or search the database for relevant articles.

Key Reading
This feature provides abstracts of articles chosen by the journal editor on the basis of their subject-matter. These are selected to provide readers with current awareness of interesting articles from other publications within the same field.

Reference Linking
Direct links are provided from the journal article references to abstracts of the most influential articles cited (where possible this is to the full text of the article).

E-mail an Article
This facility allows you to e-mail relevant and interesting articles in PDF format to another PC for later use, reference or printing purposes.

Non-Article Content
The non-article content of our journals (product and materials information, industry trends, company news, etc.) is available online so that it can be accessed by users. It is possible to browse or search non-article content by keyword.

Additional Complementary Services Available

Your access includes a variety of features that add to the functionality and value of your journal subscription:

E-mail Services
Emerald's range of free e-mail alerting services is designed to deliver personal notification of news and features in a number of different interest areas.

Emerald WIRE (World Independent Reviews)
Emerald WIRE is a fully searchable, subject-specific database brought to you by Emerald Management Reviews. It provides article reviews from the world's top management journals. The database is updated monthly and gives users details of how to obtain the full text of original articles.

Research Register
Located at **www.emeraldinsight.com/researchregister**, the Emerald Research Register is an Internet research forum where you and your readers can identify information on research activity world-wide. This feature is invaluable if you are seeking information or wish to disseminate information about your own research.

Support Resources
Comprehensive librarian and user toolkits have been created to help you get the most from your journal subscription.
For further information about what is available visit **www.emeraldinsight.com/usertoolkit**

Choice of Access

Electronic access to this journal is available via a number of channels, enabling end users and libraries to reach the content through their preferred delivery system. The Emerald Fulltext Web site – **www.emeraldinsight.com/ft** – is the recommended means of electronic access, as it provides fully searchable and high value-added access to the complete content of the journal.

Subscribers can also access and search the article content of this journal through the following journal delivery services:

EBSCOhost EJS
journals.ebsco.com

Huber E-Journals
e-journals.hanshuber.com/english/index.htm

Minerva
www.minerva.at

OCLC Firstsearch Electronic Collections Online
www.uk.oclc.org/oclc/menu/eco.htm

RoweCom's Information Quest
www.informationquest.com

SilverPlatter
www.silverplatter.com

SwetsBlackwell's SwetsWise
www.swetswise.com

Emerald Customer Support Services

For customer service and technical help, contact:
E-mail **support@emeraldinsight.com**
Tel +44 (0) 1274 785278
Fax +44 (0) 1274 785204

Emerald

Abstracts & keywords

Knowledge sharing: a game people play

Alton Chua

Keywords Knowledge management, Game theory, Payback

Examines the dynamics of knowledge sharing using the multi-person game-theoretic framework. Proposes that an individual's knowledge sharing tendency is driven by a set of contextualised concerns and interests not unlike the notion of payoff in game theory. Furthermore, the decision to share or withhold knowledge depends on that which yields a higher payoff. With this premise, submits two objectives. One is to investigate if an individual's perceived payoff of sharing knowledge is contingent on the knowledge sharing behaviour of others. The other is to analyse the perceived payoff of knowledge sharing and determine if it can be characterised by an archetypical game in the game-theoretic model. An empirical study was conducted among nearly 100 students in a local institute of higher education. The scope was confined to the students' willingness to post asynchronous entries to an electronic discussion forum. Finds that the individual student's perceived payoff of sharing knowledge was contingent on the knowledge sharing behaviour of others. Furthermore, the perceived payoff of knowledge sharing among them could be characterised by a multi-person assurance game. In conclusion, discusses three implications for managers who aim to sustain asynchronous knowledge sharing in their organisations.

Accountability and demonstration of the value of information services in South African law firms

Olwyn Garratt and Adeline du Toit

Keywords Information, Value, Law, Financial accounting, Audit, South Africa

The value of library and information services in the incorporated South African law firm was investigated with regard to accountability to corporate management. A cost accounting exercise was developed and tested in seven South African law firms of varying size. Cost per practitioner was calculated in order to correlate data from the participating organisations so that average relative spending might be determined. Attempts to relate the unit cost of library and information services to use and usefulness were inconclusive and these efforts were unable to demonstrate the value of the corporate investment. Recognised business practices relating to corporate accountability were considered with regard to the relevance to corporate support services. These included ISO 9000 and the practice of internal auditing. An information services audit was proposed in accordance with a recognised management process.

CENTRAL LIBRARY

First steps towards providing the UK with health care information and advice via their television sets: an evaluation of four Department of Health sponsored pilot services

David Nicholas, Paul Huntington, Peter Williams and Barrie Gunter

Keywords Digital, Interaction, Television, Health care, Evaluation, United Kingdom

Provides a summary of a Department of Health funded research study investigating the performance and impact of four pilot digital interactive television services in the consumer health field. These were launched in various locations in the UK in 2001. Text and video, interactive and transactional services were featured. Pilots were investigated using a combination of research methods. The four pilots' performance varied but overall there was sufficient evidence to suggest that consumer health digital interactive television has a healthy future.

Library portal solutions

Andrew Cox and Robin Yeates

Keywords Libraries, Management systems, Internet, Effectiveness

This article reviews a significant range of new products developed by library management system (LMS) suppliers, which will be referred to for convenience as library portal solutions (LPS) and whose purpose is to manage access to e-content in an integrated way with books, journals and other library stock. The article reviews current understanding of user requirements and then describes the state of the current market place, based on a survey of suppliers conducted in May and June 2002, as well as on supplier Web sites and live demonstrations. The article concludes by summarising evaluation criteria for choosing a system, and makes some tentative predictions about the development of the market place in the next five years. The perspective is primarily that of a UK academic library, but the products are certainly of interest to libraries in many sectors in every country.

E-mail overload in the UK workplace

Jenni Ingham

Keywords Electronic mail, United Kingdom, Problem identification

Establishes whether e-mail overload exists in the UK workplace through a series of in-depth interviews. Evaluates the use of e-mail and attitudes towards its use in a business environment. Concludes that e-mail has recently penetrated into organisations as a business communication tool and that the level of seniority in a company impacts on the number of e-mails sent and received. Establishes that e-mail overload exists, although it is difficult to say to what extent, as e-mail usage is sometimes very personal. Devises a set of guidelines to give advice on how to manage incoming messages.

After the disaster: drawing up the insurance claim

Robert Howes

Keywords University libraries, Disaster planning, Floods, Insurance, United Kingdom

Reports on the results of a major flood at the University of Sussex Library's repository at Lewes in October 2000, which severely damaged a collection of 42,000 books, 14,000 bound periodical volumes, microfilms, newspapers, report literature and other materials. It describes the way in which the detailed insurance claim was drawn up and the methodology used to quantify the losses, using a combination of machine-readable data, card catalogues and estimation. It also describes the methodology used to calculate the cost of restoration and the value for replacement purposes. The outcome of the claim and future plans for collection development at Sussex are summarised. The conclusion draws some general lessons for future disaster prevention on how to minimise risks from flooding and gives advice on insuring library collections as well as drawing up insurance claims after disasters.

Knowledge sharing: a game people play

Alton Chua

The author

Alton Chua is a Lecturer at Ngee Ann Polytechnic, Singapore. E-mail: altonchua@yahoo.com

Keywords

Knowledge management, Game theory, Payback

Abstract

Examines the dynamics of knowledge sharing using the multi-person game-theoretic framework. Proposes that an individual's knowledge sharing tendency is driven by a set of contextualised concerns and interests not unlike the notion of payoff in game theory. Furthermore, the decision to share or withhold knowledge depends on that which yields a higher payoff. With this premise, submits two objectives. One is to investigate if an individual's perceived payoff of sharing knowledge is contingent on the knowledge sharing behaviour of others. The other is to analyse the perceived payoff of knowledge sharing and determine if it can be characterised by an archetypical game in the game-theoretic model. An empirical study was conducted among nearly 100 students in a local institute of higher education. The scope was confined to the students' willingness to post asynchronous entries to an electronic discussion forum. Finds that the individual student's perceived payoff of sharing knowledge was contingent on the knowledge sharing behaviour of others. Furthermore, the perceived payoff of knowledge sharing among them could be characterised by a multi-person assurance game. In conclusion, discusses three implications for managers who aim to sustain asynchronous knowledge sharing in their organisations.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 3 · 2003 · pp. 117-129
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310472615

Introduction

The notion of knowledge sharing has attracted much attention from both researchers and practitioners in the field of knowledge management. Many studies have been done to identify the factors that impede knowledge sharing. Several best practices have also been uncovered in organisations that exhibited systematic knowledge sharing phenomena. However, there are still gaps in our understanding of why and when knowledge sharing occurs. Many questions related to the dynamics of knowledge sharing remain unanswered. For example, why are some incentive schemes designed to promoting knowledge sharing highly effective in some organisations but fail in others? Why are there pockets of people who passionately share knowledge among themselves even though they belong to an organisation whose culture resists knowledge sharing? When is an individual likely to share knowledge?

For this reason, this paper seeks to advance understanding on knowledge sharing by carrying out an empirical study that uses the game-theoretic framework. It has two objectives. One is to investigate if an individual's perceived payoff of sharing knowledge is contingent on the knowledge sharing behaviour of others. The second is to analyse the perceived payoff of knowledge sharing and determine if it can be characterised by an archetypical game in the game-theoretic model. These objectives have implications on how managers can promote knowledge sharing in their organisations.

This paper is organised as follows. First, it discusses the extant work done on knowledge sharing and conceives knowledge sharing as a decision made on the basis of a contextually determined perceived payoff by the one who shares. It further argues that such a perspective lends itself suitable for analysis using the game-theoretic framework. Next, it presents the fundamentals of game theory and the three archetypical games. Following that, an empirical study conducted to test the two propositions submitted in this paper is described. Finally, this paper analyses the findings that emerged from the study and discusses three implications for managers who aim to sustain asynchronous knowledge sharing in their organisations.

Knowledge sharing

Several scholars have sought to distinguish between information and knowledge (Kock *et al.*, 1997; Davenport and Prusak, 1999; Natarajan and Shekhar, 2000). The former is commonly defined as data that are being interpreted through analysis, correlation and summary, while the latter is defined as information that is validated and endowed with meaning through experiences, beliefs, values and insights (Davenport and Prusak, 1999). Information is usually person-independent whereas knowledge is context-sensitive (Natarajan and Shekhar, 2000). This means that information can be easily detached and transferred from its source without losing its meaning, but knowledge has to be shared within a specific context for its essence to be grasped. Since knowledge is enriched with insights and is socially embedded in organisational practices, it is not easily imitated, traded or substituted. Hence, knowledge sharing is an important strategy for developing a competitive advantage for any organisations (McEvily *et al.*, 2000).

Successful companies are those capable of capturing knowledge acquired by one part of the organisation and leveraging it for other parts. Siemens' sale team in Malaysia, for example, was able to secure a large telecommunication contract primarily because of the knowledge and experience gained by their peers in Denmark (Wenger *et al.*, 2002). As a result of introducing knowledge sharing initiatives, firms such as Buckman Laboratories and Texas Instruments have seen enormous gain in revenues, while those such as Dow Chemical and Chevron have reported tremendous savings (O'Dell and Grayson, 1998).

Knowledge sharing is the process by which individuals collectively and iteratively refine a thought, an idea or a suggestion in the light of experiences. The original idea may be progressively modified or gradually rejected until a shared perspective emerges (West and Meyer, 1997; Rogers, 1986). Knowledge can be shared through face-to-face interactions (Dixon, 2000), synchronous and asynchronous communication using an electronic knowledge repository (Lynne, 2001). The degree of explicitness of knowledge shared is influenced by the media richness of the communication channels used (Chua, 2001). For example, highly tacit knowledge can be shared through face-to-face interactions, but knowledge has to be codified first when a text-based electronic discussion is used.

As a matter of fact, some extent of knowledge sharing takes place among organisation members regardless of whether this process is deliberately managed. When a technician asks a fellow colleague how a work-related problem can be solved, knowledge is shared when help is given. However, even as a natural social phenomenon, unmanaged knowledge sharing processes are local and fragmentary (Davenport and Prusak, 1999). They may neither be efficient nor effective (Gupta and Govindarajan, 2000; Szulanski, 1996). If this is so, the value of knowledge in the organisation cannot be fully leveraged. In fact, several instances of corporate failures in the risk management firms such as Baring Securities, Kidder Peabody, and Metallgesellschaft Refining and Marketing have been attributed to poor internal knowledge sharing mechanisms (Marshall *et al.*, 1996). For this reason, an important agenda of knowledge management initiatives is to systematically foster knowledge sharing among organisation members (Martin, 2000).

Many studies have been done to examine the factors that impede knowledge sharing. One factor is the lack of visible top management support for knowledge sharing activities (Trussler, 1998). Another factor is the failure to make knowledge sharing a basis for advancement in the organisation (Hiebeler, 1996). Most existing incentive systems neither recognise nor reward knowledge sharing behaviour. The third factor is the ignorance among organisation members (O'Dell and Grayson, 1998). Especially in large organisations, organisation members may not be aware of someone who would be interested in the knowledge they have or has the knowledge they require. The final and probably the most significant factor is the lack of a relationship between the source and the recipient of knowledge (Chow *et al.*, 2000). When there is an absence of a strong personal tie that warrants listening to or helping each other, knowledge sharing is hampered (O'Dell and Grayson, 1998; von Krogh, 1998). These factors are mutually reinforcing. The resultant effect is a cultural resistance to knowledge sharing (Scheraga, 1998; Ruggles, 1998; Microsoft, 2000; De Long and Fahey, 2000).

Several strategies that could foster knowledge sharing include using technology appropriately (O'Dell and Grayson, 1998), introducing incentive schemes for knowledge sharing (Matusik and Hill, 1998; Trussler, 1998), cultivating communities of practice (Wenger *et al.*, 2002), providing role models (Hiebeler, 1996) and creating centres of excellence across functional divisions (Puccinelli, 1998). A study done on some 40 companies that exemplify desirable knowledge sharing practices revealed that these companies not only integrate knowledge sharing into their business strategy, they develop approaches and styles that match their prevailing organisational culture to minimise resistance (McDermott and O'Dell, 2001). For example, Ford openly talks about the importance of knowledge sharing, conducts internal advertising and organises knowledge sharing events. Lotus, on the other hand, works through informal teams to share knowledge based on their business needs. While these recommendations provide useful insight in promoting the general climate of knowledge sharing in the organisation, they provide little explanation on its occurrence.

There are currently two ways of thinking that could shed some light on the underlying forces that govern knowledge sharing (Cohen, 1998). The first is the notion of a knowledge market (Davenport and Prusak, 1999). Knowledge sharing is conceived as a transaction that takes place among buyers, sellers and brokers in the knowledge market. Given their limited time and energy, individuals engage in a knowledge transaction only when they believe it will give them a worthwhile return on those scarce resources. The knowledge market perspective builds on the economic exchange theory and it asserts that individuals are driven by rational self-interest (Gee and Kim, 2002). Knowledge sharing will occur when its reward exceeds its costs (Monge *et al.*, 1998; Kelley and Thibaut, 1978; Constant *et al.*, 1994). The second is the notion of knowledge community (von Krogh, 1998, Nonaka and Takeuchi, 1995). This perspective emphasises less on knowledge transactions but more on personal connection and commitment to shared success. On the basis of trust and relationships, individuals develop a genuine concern for each other. The motivation to share knowledge is therefore inspired by love, care and generosity.

The knowledge market perspective tends to conceive knowledge sharing behaviour as a transaction laden with self-serving and calculative overtones, while the knowledge community perspective tends to conceive knowledge sharing behaviour as an activity that emerges out of utopia. This paper recognises the value of each perspective and seeks to converge the two. It proposes that knowledge sharing occurrence is governed by the perceived payoff, which accommodates extrinsic, intrinsic and social dimensions. This notion is supported by the theory of information sharing (Constant *et al.*, 1994) and the two-person game-theoretic framework of knowledge transfer (Loebecke *et al.*, 1999).

The theory of information sharing seeks to explain the factors that support or constrain information sharing. It goes beyond communication and information exchanges among friends and personal contacts to include strangers the sender will never meet. The theory considers both organisational factors as well as psychological factors such as feelings, values, and self-identities (Constant *et al.*, 1999). The two-person game-theoretic framework of knowledge transfer, on the other hand, examines the net value that individuals would gain when they share or withhold knowledge. The framework considers the following components: the basic value of each other's knowledge, the synergetic value reaped as a result of sharing, the value of monopolistic knowledge which can only be retained by withholding, the leveragability of sharer's knowledge from which the recipient can gain and the loss of valuable knowledge, known also as the negative reverse-impact.

This paper argues that the perceived payoff of knowledge sharing has social, economic and political bearings specific to the one who shares and to the environment in which the sharing of knowledge takes place. It encapsulates myriad contextual elements comprising the interests and concerns, and it succinctly represents all that an individual really cares about in sharing knowledge in a given instance. Such perspective can be used to examine why individuals are or are not sharing their knowledge, regardless of the sophistication of technology, organisational mandate, or financial incentives.

The interests in knowledge sharing encompass expected rewards, expected associations and expected contribution (Gee and Kim, 2002). These refer respectively to extrinsic incentives, enhancement in mutual relationships and improvement in the organisation's performance an individual expects to reap when knowledge is shared. Examples of an individual's interests in sharing knowledge include creating or reinforcing of an expert image among peers (Jarvenpaa and Staples, 2001), promoting one's visibility in the organisation, fulfilling an organisational obligation, establishing future relationships, altruistically wanting to help others (Davenport and Prusak, 1999), or improving the competencies of the department. The concerns encompass the efforts and costs an individual has to incur to share knowledge. Examples of concerns in sharing knowledge include the amount of time and resources required, the breach of confidential knowledge (Weiss, 1999), the loss of valuable knowledge, or the risk of losing one's face as a result of sharing knowledge that is not regarded to be valuable (Chow *et al.*, 2000).

The relative significance of the various interests and concerns of sharing knowledge differ from individual to individual and from instance to instance. Furthermore, they are moulded by national culture (Triandis, 1989; Erez and Earley, 1993; Chow *et al.*, 2000), organisational culture, personal values and self-identities (Jarvenpaa and Staples, 2001). In particular, since knowledge sharing is heavily social in nature, the perceived payoff of knowledge sharing is affected by social factors such as trust (Schrader, 1990; McDermott and O'Dell, 2001), care (von Krogh, 1998), emotional commitment and the quality of the relationship (Weiss, 1999). Since social factors are precipitated by a bilateral relationship between the one who shares and the one who receives knowledge, knowledge sharing behaviour can only be sustained through reciprocity. An individual shares knowledge in reciprocation because it is both a socially expected behaviour (Constant *et al.*, 1994) as well as a means to obtain desired resources for mutual benefits (Tyler, 1999). Conversely, when knowledge sharing is not reciprocated, knowledge sharing behaviour is impeded. This is consistent with the social exchange theory (Kelley and Thibaut, 1978). When applied to a group, this paper posits that an individual's knowledge sharing behaviour is contingent upon that of others in the group. Hence, the first proposition is submitted:

P1. An individual's perceived payoff of sharing knowledge in a group is contingent on the knowledge sharing behaviour of others in the group.

Game theory and archetypical games

When knowledge sharing is conceived as a decision governed by the perceived payoff, it possesses a few distinctive features that are also found in the structure of strategic games. First, the individuals who engage in knowledge sharing are usually defined within a context, in an organisation or a community of practice. In addition, knowledge sharing involves two or more persons. Similarly, strategic games are played between two or more known players. Next, within the realm of knowledge sharing, each individual chooses between two decisions, either to share or withhold knowledge. Similarly, most strategic games involve a set of mutually exclusive strategies from which one is chosen. Finally, as mentioned earlier, the perceived payoff for an individual who contemplates sharing knowledge encapsulates all his interests and concerns. The decision to either share or withhold knowledge is dependent on the action that yields a higher payoff. This is consistent with the general economic principles in everyday life (Friedman, 1997). Similarly, in strategic games, the rationality of all players is assumed. The goal of every player is to decide on a strategy that yields the maximum payoff. For the above reasons, knowledge sharing is deemed suitable to be examined using game theory.

Having its roots in mathematics and economics, game theory is the science of rational behaviour in interactive situations where the actions of participants alter one another's outcomes (Dixit and Skeath, 1999). Essentially, game theory provides a framework to analyse the strategic positions of the various parties engaged within a scheme of choices, each fully aware of the others' objectives, constraints and positions. Game theory has been applied to many disciplines, including economics, business, political science, psychology and philosophy (Dixit and Skeath, 1999). It has been used to analyse several situations, such as the power in the parliamentary assembly, the functioning of auctions, economics of information, arbitration procedures, bargaining and negotiations between two or more parties (Brams, 1990; Ponssard, 1981) and knowledge transfers among rival organisations (von Hippel, 1994; Schrader, 1990; Loebecke *et al.*, 1999).

Two important terms commonly used in strategic games are strategies and payoffs. Strategies refer to the choices available to the players. Payoffs are numerical representations associated to each available combination of choices of strategies by all the players. The payoff structure in a strategic game is unique to each player and it denotes the extent to which an outcome is favourable for that player. The payoffs for one player capture everything in the outcomes of the game that the player cares about. Hence, it is in the interest of the player to choose a strategy that yields the maximum payoff. To illustrate the strategies available to all players as well as the corresponding payoffs, a payoff matrix is usually used. An example of a payoff matrix can be found in Table I.

In a strategic game, it is assumed that each player chooses the strategy that yields the maximum payoff for himself. A dominant strategy is one that out-performs all other strategies regardless of the choices made by the other players. The other strategies are said to be dominated strategies.

For the sake of simplicity, a two-person game will first be considered. Each player can choose one out of two mutually exclusive strategies, generically, to participate or shirk. Hence, there are a total of four possible decisions jointly made by the two players. Assuming that the game is symmetric, the payoff of each player will be the same when both participate or when both shirk. Based on this scenario, the payoff matrix of a two-person game can be generalised as shown in Table I.

Depending on the relative payoff values of a, b, c and d in Table I, a game can be classified as one of the three archetypes, namely, prisoners' dilemma, chicken or assurance (Dixit and Skeath, 1995; Kay, 1995).

Table I Generalised payoff table of a two-person game

		Person 2	
		Participate	**Shirk**
Person 1	Participate	a^a, a^b	b^a, c^b
	Shirk	c^a, b^b	d^a, d^b

Notes: ^{a}Payoff of Person 1; ^{b}Payoff of Person 2

Prisoners' dilemma

If $c > a$, $a > d$, $d > b$, this game is a prisoners' dilemma. Table II shows an example of a prisoners' dilemma having arbitrary payoffs for the players. If Person 2 participates, Person 1 receives a payoff of 7 if he/she participates and a payoff of 10 if he/she shirks. If Person 2 shirks, Person 1 receives a payoff of 3 if he participates and a payoff of 5 if he/she shirks. Hence in both cases, Person 1 is better off by choosing to shirk. The same logic applies for Person 2: he/she is better off by choosing to shirk. In a prisoners' dilemma, shirking is therefore the dominant strategy for individual players. However, if both players choose to shirk, each receives a payoff worse off than if they both choose to participate. To reap maximum benefit, each player would need to co-operate with the other by choosing the dominated strategy together. Hence, a prisoners' dilemma is also known as a game of co-operation (Kay, 1995).

Chicken

If $c > a$, $b > d$, then this is a game of chicken. Table III shows an example of a game of chicken. If Person 2 participates, Person 1 receives a payoff of 7 if he/she participates and a payoff of 10 if he/she shirks. In this case, Person 1 is better off by choosing to shirk. If Person 2 shirks, Person 1 receives a payoff of 5 if he/she participates and a payoff of 3 if he/she shirks. In this case, Person 1 is better off by choosing to participate. Hence, in chicken, the dominant strategy for the individual player does not exist. Instead, the strategy is to shirk if the other player participates and participate if the other player shirks. Since both players maximise their payoffs by not choosing the same strategy as the other, chicken is also known as a game of differentiation (Kay, 1995).

Table II Example of a prisoners' dilemma

		Person 2	
		Participate	**Shirk**
Person 1	Participate	7, 7	3, 10
	Shirk	10, 3	5, 5

Table III Example of a chicken

		Person 2	
		Participate	**Shirk**
Person 1	Participate	7, 7	5, 10
	Shirk	10, 5	3, 3

Assurance

If $a > c$, $a > d$, $d > b$, then this is a game of assurance. Table IV shows an example of an assurance game. If Person 2 participates, Person 1 receives a payoff of 10 if he participates and a payoff of 7 if he shirks. In this case, Person 1 is better off by choosing to participate. If Person 2 shirks, Person 1 receives a payoff of 3 if he participates and a payoff of 5 if he shirks. In this case, Person 1 is better off by choosing to shirk. Hence, in an assurance game, the dominant strategy for the individual player does not exist. Instead, the strategy is to participate if the other player participates and shirk if the other player shirks. Since both players maximise their payoffs by choosing the same strategy as the other, the assurance game is also known as the game of coordination or Battle of the Sexes (Kay, 1995).

Multi-person games

In a multi-person game, the payoff for each player is dependent on the number of players who participate and shirk. Supposing in a population of N players, there are n number of players who participate. Each participant receives a payoff of $p(n)$, while each shirker receives a payoff of $s(n)$.

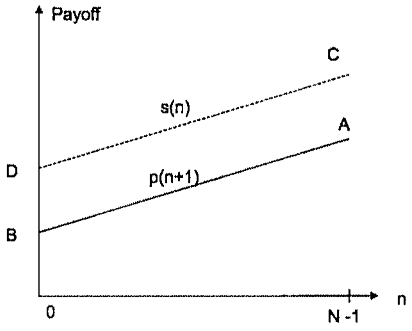
When a shirker decides to participate, the number of players who participate will be n + 1. He would receive a payoff of $p(n+1)$. If he decides to remain a shirker, his payoff would be $s(n)$. Hence, an individual would participate if $p(n+1) > s(n)$ and would shirk if $p(n+1) < s(n)$.

Figure 1 shows the payoff of the multi-person prisoners' dilemma. The vertical axis represents an individual's payoff while the horizontal axis represents the number of participants in the population. In the prisoners' dilemma, shirking is the dominant strategy, regardless of the number of players who participate. Hence, $s(n) > p(n+1)$ for all values of n (Dixit and Skeath, 1999). When the rest of the population participate, an individual is better off if he shirks ($C > A$). When none in the population participate, an individual is still better off if he shirks ($D > B$).

Table IV Example of an assurance game

		Person 2	
		Participate	**Shirk**
Person 1	Participate	10, 10	3, 7
	Shirk	7, 3	5, 5

Figure 1 Multi-person prisoners' dilemma



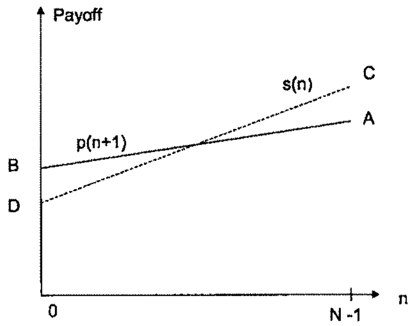
Source: Dixit and Skeath (1999)

In the game of chicken, $p(n+1) > s(n)$ for small values of n, but $p(n+1) < s(n)$ for large values of n (Dixit and Skeath, 1999). Figure 2 shows the payoff of the multi-person chicken. When the rest of the population participate, an individual is better off if he/she shirks ($C > A$). When none in the population participate, an individual is better off if he/she participates ($D > B$). So, in a multi-person chicken, when few are participating, the strategy is to participate. Conversely, when many are participating, the strategy is to shirk.

In the assurance game, $s(n) > p(n+1)$ for small values of n whereas $p(n+1) > s(n)$ for large values of n (Dixit and Skeath, 1999). Figure 3 shows the payoff of the multi-person assurance game. When the rest of the population participate, an individual is better off if he/she participates ($A > C$). When none in the population participate, an individual is better off if he/she shirks ($D > B$). So, in multi-person assurance game, when few are participating, the strategy is to shirk. Conversely, when many are participating, the strategy is to participate.

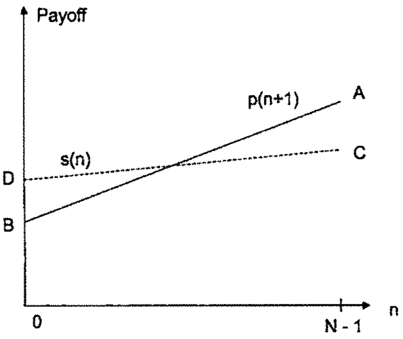
In summary, a multi-person game can be illustrated graphically using two lines, namely BA and DC that show the payoff of the

Figure 2 Multi-person chicken



Source: Dixit and Skeath (1999)

Figure 3 Multi-person assurance game



Source: Dixit and Skeath (1999)

individual who participates and shirks respectively. At point A and point C, the rest of the population participates; at point B and point C, none in the population participate. If point A > point C and point B > point D, then the game is prisoners' dilemma. If point A < point C and point B > point D, then it is a game of chicken. Finally, if point A > point C and point B < point D, then it is an assurance game.

Argued earlier, when knowledge sharing is conceived as a decision made on the basis of the perceived payoff, it is compatible with the structure of a strategic game. The dynamics experienced among a group of known individuals contemplating to share knowledge is posited to be characterised by a multi-person game. The two generic strategies described, namely, "participate" and "shirk", are operationalised as "share knowledge" and "withhold knowledge" respectively. Hence the second proposition is submitted:

P2. An individual's perceived payoff in sharing knowledge among a group of organisation members can be characterised by an archetypical multi-person game in game theory.

An empirical study

Research context

An empirical study was conducted in a local institute of higher education among all second-year students (N = 120) in the Diploma in Business Information Technology. A large majority (> 95 per cent) of them were local students whose mean age was 18. They were generally well acquainted with one another because they had been in the same cohort for more than a year.

Students in the institute had been given access to asynchronous electronic discussion rooms within which they could interact among themselves. Students could post ideas, suggestions, questions as well as thread responses to the earlier entries posted by other classmates. Contributing to the discussion room was done entirely on a voluntary basis.

This study was conducted at the beginning of the semester and its scope was confined to the students' willingness to contribute in the discussion room designated specifically for an information technology module. Knowledge sharing was operationally defined as making studies-related contributions to the discussion room. This included posting answers to tutorial questions, sharing a programming tip or raising questions about certain topics discussed in the lectures. The payoff of knowledge sharing was operationally defined by a scale that measured the students' perception of the major concerns and interests related to making contributions to the discussion room. The items on the scale were contextually determined from the students.

Research design

The study was conducted using a two-phase data collection method. The first phase involved two focus group meetings among ten randomly selected students. The purpose of the focus group meetings was to identify elements that were either of concern or interest to the students as they decided whether to contribute to the electronic discussion room. Hence, an instrument that measured the perceived payoff of knowledge sharing could be established contextually.

The second phase involved a questionnaire, which was administered to all second-year students. The questionnaire was developed from the findings elicited from the focus group meetings. Its purpose was to measure the students' perceived payoffs of knowledge sharing under different situations. For parsimonious reasons, only four definitive situations have been included: (*S*1) when both the respondent and the rest of his peers share knowledge, (*S*2) when the respondent is the only one who shares knowledge but none of his peers do, (*S*3) when the respondent is the only one who does not share knowledge but all his peers do and (*S*4) neither the respondent nor the rest of his peers shares knowledge. These situations are tabulated in Table V.

P1 can be tested by analysing the variances of the payoffs of knowledge sharing under the four situations, namely, *S*1, *S*2, *S*3 and *S*4. *S*1 and *S*2 represent point *A* and point *B* on the $p(n+1)$ line, while *S*3 and *S*4 represent point *C* and point *D* on the $s(n)$ line in the multi-person game payoff graphs shown in Figure 1, Figure 2 and Figure 3. *P2* can be tested by comparing S1 with S3 and S2 with S4 using one-tail *t*-tests.

Data collection and analysis

From the two focus group meetings, five concerns/interests pertinent to the students as they contemplated contributing to the electronic discussion room were identified using inductive analysis. They were:

1. level of understanding of the module;
2. final grade of the module;
3. self-worth;
4. sense of recognition among peers; and
5. level of rapport with peers.

Shown in the Appendix, the questionnaire comprises four sections within which these five items are presented. Sections 1, 2, 3 and 4 measure the payoff of knowledge sharing under the four situations, namely, *S*1, *S*2, *S*3 and *S*4 respectively.

The response rate to the questionnaire was 82.5 per cent ($n = 99$). The reliability of data collected was measured by checking for inter-item correlations in the variables. Cronbach's alpha was used because it provides a good estimate of reliability and is preferred over the split-half method (Nunnally, 1978). Table VI shows Cronbach's alpha coefficients of the four variables in the questionnaire. Since Nunnally (1978) suggested the value of at least 0.70 as the basis of reliability for Cronbach's alpha coefficient, all responses collected had passed the reliability test.

Table V Four situations in knowledge sharing

		The individual Shares knowledge	 Does not share
The rest of his peers	Share knowledge	*S*1	*S*3
	Do not share	*S*2	*S*4

Table VI Cronbach's alpha coefficients of variables in the questionnaire

Variables	Cronbach's alpha coefficient ($n = 99$)
*S*1	0.7366
*S*2	0.7512
*S*3	0.7428
*S*4	0.8584

Table VII shows the mean scores and standard deviation obtained for each variable.

Figure 4 shows the values of *S*1, *S*2, *S*3 and *S*4 plotted on the payoff graph. A linear relationship between the payoff and the number of participants is assumed.

Since the data were interval-scaled and the sample size was more than 30, normal distribution could be assumed. Furthermore, the standard deviations were also known. Hence, it would be appropriate to use ANOVA to test *P1* and a one-tail *t*-test to test *P2*.

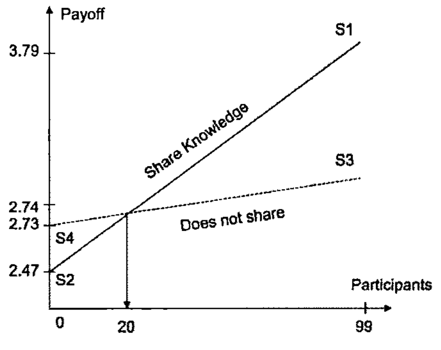
At a 5 per cent level of significance, *S*1, *S*2, *S*3 and *S*4 were found not to have equal variances ($p < 0.05$). This means that a student's perceived payoff of sharing knowledge varied according to the different situations which depict whether he and the rest of his peers share knowledge or otherwise. *P1* is thus supported.

At a 5 per cent level of significance, $S1 > S3$ ($p < 0.05$) and $S2 < S4$ ($p < 0.05$). The first inequality means that when the rest of his peers share knowledge, a student is better off sharing knowledge than if he did not. The second inequality means that when the rest of his peers do not share knowledge, a student is better off not sharing than if he did. Such a

Table VII Descriptive statistics of *S*1, *S*2, *S*3 and *S*4

Variables	Mean score	Standard deviation
*S*1	3.79	0.54
*S*2	2.47	0.67
*S*3	2.74	0.78
*S*4	2.73	0.62

Figure 4 Values of *S*1, *S*2, *S*3 and *S*4 plotted



payoff structure corresponds to that of a multi-person assurance game. *P2* is thus supported.

Discussion

Three findings have emerged from this study. First, different groups of individuals in different contexts hold different interests and concerns about knowledge sharing. In this study, the participants, who were students, had some five main interests and concerns that were mostly related to cognitive performance and relational issues. If this study were to be replicated in a typically fast-paced organisation in which people juggle among different priorities, such as career aspiration, family commitment and meeting tight project deadlines, the interests and concerns associated with knowledge sharing would greatly differ from that found in this study. For example, the concern about expending time to share knowledge, which was not raised by the participants in this study, might have been elicited. Furthermore, other interests and concerns like promotion prospects and building an expert image might also have been included.

It is worthwhile for managers responsible for engendering knowledge sharing in their organisations to first understand the issues that either propel or hinder knowledge sharing tendency among members in the group. This is possible only when managers are well acquainted with the group and are knowledgeable about the members' interests and concerns in sharing knowledge. Managers can choose from a range of data collection methods such as focus group discussions, surveys, one-to-one talks or off-site meetings to elicit the issues pertinent to the members. The issues may include a host of motivational factors, de-motivational factors, personal aspirations, work priorities and the impact of practices enforced organisation-wide, for example, as a result of the intention to achieve ISO certification. From among these issues, managers need to identify and prioritise the more significant ones for follow-up actions.

Thereafter, managers can introduce interventions that specifically address the significant issues. For example, if members are concerned about not receiving enough management recognition, then overt acknowledgement from the management could be given as an incentive for participation. In addition, salient points and the names of the contributors can be culled from the discussions periodically and be submitted to the management for their attention. If members are concerned about the difficulty of contributing an entry into the discussion forum, then the user-friendliness of the system has to be dealt with. Furthermore, user-training sessions, helpdesk support and other technical assistance need to be put in place.

Second, since *S*1, *S*2, *S*3 and *S*4 were found not to have equal variances, this implies that an individual's perceived payoff varied according to the joint decision between himself and the rest of his peers to share knowledge or otherwise. The notion of payoff represents an aggregation of all interests and concerns held by an individual and its purpose is to serve as proxy to an individual's likelihood to share knowledge. Hence, the confirmation of *P1* means that an individual's decision to share knowledge is influenced in part by the decisions of others to share knowledge as well.

It must be recognised that knowledge sharing does not occur in a social vacuum but is engendered through the reciprocal relationships among members in the group. As generosity begets generosity, miserliness begets miserliness. Thus, managers who wish to promote asynchronous knowledge sharing need to establish norms of cooperation, cordiality, goodwill and trust in the group. These efforts require managers to foster interaction within the group not merely through the electronic platform, but also face-to-face encounters. For example, managers can encourage informal chat around the water-cooler, organise holiday parties (von Krogh, 1998), deploy staff to be involved in taskforce and cross-functional teams (Nonaka and Konno, 1998).

Third, an individual's perceived payoff of knowledge sharing varied with the number of people who participated in knowledge sharing. Given the number of people who participated in knowledge sharing, an individual's perceived payoff of knowledge sharing and that of withholding knowledge differed. In particular, when the rest of his peers share knowledge, an individual is better off sharing than withholding knowledge (*S*1 > *S*3). When the rest of his peers withhold knowledge, an individual is better off withholding than sharing knowledge ($S2 < S4$). Such payoff structure matches with that of a multi-person assurance game. This not only confirms *P2*, it also means that the principle of reciprocity was found to operate among the participants in this study.

When a linear relationship between the payoff and the number of participants is assumed as shown in Figure 4, an individual's perceived payoff to share knowledge intersects with that to withhold knowledge at the point where the number of participants who shared knowledge is 20 (20.2 per cent). In other words, an individual was better off sharing than withholding knowledge when there were at least 20 participants who shared knowledge. However, given the small population size targeted and the specific context in which this study was done, this finding has to be treated with caution. Moreover, in reality, $S1$-$S2$ and $S3$-$S4$ in Figure 4 do not have to be straight lines and may intersect at more than one point. Hence, the minimum participation rate of 20.2 per cent of the population needed to create the propensity for knowledge sharing may not be a generalisable figure. Even so, the results still have practical implications for managers. For knowledge sharing behaviour to be engendered and sustained effectively among participants accessing a common electronic repository, participation rate has to exceed a minimum threshold. When that happens, a positive reinforcement of knowledge sharing will be invoked. The challenge for managers who are responsible for launching electronic discussion forums for a group of people in the organisation is therefore to ensure as high a participation rate as possible at the initial stage. This would generate the impetus to keep the contributions forthcoming. Suggestions to foster a high initial participation rate include intensive internal marketing, using incentives such as a lucky draw, identifying a theme that is of great interest or concern to the group and seeking to solicit members' views via the electronic forum.

Conclusion

This paper represents a first step towards advancing the understanding of knowledge sharing using a multi-person game-theoretic framework. A major argument submitted is that knowledge sharing is governed by a perceived payoff contextually specific to the one who shares and to the environment in which the sharing takes place. The perceived payoff encapsulates all the interests and concerns pertinent to that individual. This perspective helps explain why some incentive schemes are effective in some organisations but fail in others. It also sheds light on knowledge sharing occurrences among a group of people.

The empirical work was done among students in an institute of higher education and the notion of knowledge sharing was confined to the posting of entries in an electronic discussion forum. From the data collected, it was confirmed that an individual's likelihood to share knowledge was contingent on the likelihood of others to do likewise. In addition, the perceived payoffs of knowledge sharing among a group of individuals could be characterised by a multi-person assurance game.

The findings which have emerged from this study have the following implications for managers who aim to sustain asynchronous knowledge sharing among a group of people in their organisations. First, managers need to understand the interests and concerns of the people and introduce specific interventions to improve the perceived payoff of knowledge sharing. Second, managers need to prioritise face-to-face interaction among the people and establish the norms of cooperation. Third, in launching the electronic forum for knowledge sharing, managers need to target an initial minimum participation rate to create the propensity for more contributions.

References

Brams, J.S. (1990), *Negotiation Games*, Routledge, New York, NY.

Chow, C.W., Deng, F.J. and Ho, L.J. (2000), "The openness of knowledge sharing within organizations: a comparative study in the United States and the People's Republic of China", *Journal of Management Accounting Research*, Vol. 12, November, pp. 65-95.

Chua, A. (2001), "Relationship between the types of knowledge shared and the types of communication channels used", *Journal of Knowledge Management Practice*, Vol. 2, October, available at: www.tlainc.com/articl26.htm

Cohen, D. (1998), "Toward a knowledge context: report on the first annual U.C. Berkeley forum on knowledge and the firm", *California Management Review*, Vol. 40 No. 3, pp. 22-39.

Constant, D., Kiesler, S. and Sproull, L. (1994), "What's mine is ours, or is it? A study of attitudes about information sharing", *Information Systems Research*, Vol. 5 No. 4, pp. 400-21.

Davenport, T. and Prusak, L. (1999), *Working Knowledge*, Harvard Business School Press, Boston, MA.

De Long, D.W. and Fahey, L. (2000), "Diagnosing cultural barriers to knowledge management", *The Academy of Management Executive*, Vol. 14 No. 4, pp. 113-27.

Dixit, A. and Skeath, S. (1999), *Games of Strategy*, WW Norton and Company, New York, NY.

Dixon, N.M. (2000), *Common Knowledge: How Companies Thrive by Sharing What They Know*, Harvard Business School Press, Boston, MA.

Erez, M. and Earley, C. (1993), *Culture, Self-identity, and Work*, Oxford University Press, New York, NY.

Friedman, D. (1997), *Hidden Order: The Economics of Everyday Life*, Harper Business, Toronto.

Gee, W.B. and Kim, Y.G. (2002), "Breaking the myths of rewards: an exploratory study of attitudes about knowledge sharing", *Information Resources Management Journal*, Vol. 15 No. 2, pp. 14-21.

Gupta, A.K. and Govindarajan, V. (2000), "Knowledge flows within multinational corporations", *Strategic Management Journal*, Vol. 21 No. 4, pp. 473-96.

Hiebeler, R.J. (1996), "Benchmarking: knowledge management", *Strategy & Leadership*, Vol. 24 No. 2, pp. 22-9.

Jarvenpaa and Staples (2001), "Exploring perceptions of organizational ownership of information and expertise", *Journal of Management Information Systems*, Vol. 18 No. 1, pp. 151-83.

Kay, J. (1995), *Foundations of Corporate Success*, Oxford University Press, New York, NY.

Kelley, H.H. and Thibaut, J. (1978), *The Social Psychology of Groups*, Wiley, New York, NY.

Kock, N.F. Jr, McQueen, R.J. and Corner, J.L. (1997), "The nature of data, information and knowledge exchange in business processes: implications for process improvement and organizational learning", *The Learning Organization*, Vol. 4 No. 2, pp. 70-80.

Loebecke, C., van Fenema, P.C. and Powell, P. (1999), "Co-opetition and knowledge transfer", *Database for Advances in Information Systems*, Vol. 30 No. 2, pp. 14-25.

Lynne, M.M. (2001), "Toward a theory of knowledge reuse: types of knowledge reuse situations and factors in reuse success", *Journal of Management Information Systems*, Vol. 18 No. 1, pp. 57-93.

McDermott, R. and O'Dell, C. (2001), "Overcoming cultural barriers to sharing knowledge", *Journal of Knowledge Management*, Vol. 5 No. 1, pp. 76-85.

McEvily, S.K., Das, S. and McCabe, K. (2000), "Avoiding competence substitution through knowledge sharing", *The Academy of Management Review*, Vol. 25 No. 2, pp. 296-311.

Marshall, C., Prusak, L. and Shpilberg, D. (1996), "Financial risk and the need for superior knowledge management", *California Management Review*, Vol. 38 No. 3, pp. 77-101.

Martin, B. (2000), "Knowledge management within the context of management: an evolving relationship", *Singapore Management Review*, Vol. 22 No. 2, pp. 17-36.

Matusik, F.S. and Hill, C.W.L. (1998), "The utilization of contingent work, knowledge creation, and competitive advantage", *The Academy of Management Review*, Vol. 23 No. 4, pp. 680-97.

Microsoft (2000), "Practicing knowledge management: turning experience and information into results", available at: http://infoperpus.8m.com/artikel/00006.htm (accessed 26 July 2002).

Monge, P.R., Fulk, J., Kalman, M.E., Flanagin, A.J., Parnassa, C. and Rumsey, S. (1998), "Production of collective action in alliance-based interorganizational communication and information systems", *Organization Science*, Vol. 9 No. 2, pp. 411-33.

Natarajan, G. and Shekhar, S. (2000), *Knowledge Management: Enabling Business Growth*, McGraw-Hill, Tata, New Delhi.

Nonaka, I. and Konno, N. (1998), "The concept of 'ba': building a foundation for knowledge creation", *California Management Review*, Vol. 40 No. 3, pp. 40-54.

Nonaka, I. and Takeuchi, H. (1995), *The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press, New York, NY.

Nunnally (1978), *Pscyhometric Theory*, McGraw-Hill, New York, NY.

O'Dell, C. and Grayson, C.J. (1998), "If only we knew what we know: identification and transfer of internal best practices", *California Management Review*, Vol. 40 No. 3, pp. 154-74.

Ponssard, J.P. (1981), *Competitive Strategy*, North-Holland Publishing Company, New York, NY.

Puccinelli, B. (1998), "Strategies for sharing knowledge", *Inform*, Vol. 12 No. 9, pp. 40-1.

Rogers, E.M. (1986), *Communication Technology: The New Media in Society*, Free Press, New York, NY.

Ruggles, R. (1998), "The state of the notion: knowledge management in practice", *California Management Review*, Vol. 40 No. 3, pp. 80-9.

Scheraga, D. (1998), "Knowledge management competitive advantages becomes a key issue", *Chemical Market Reporter*, Vol. 254 No. 17, pp. 3-27.

Schrader, S. (1990), *Zwischenbetrieblicher Informations transfer. Eine Empirische Analyse Kooperativen Verhaltens*, Dunker & Humbolt, Berlin.

Szulanski, G. (1996), "Exploring internal stickiness: impediments to transfer of best practice within the firm", *Strategic Management Journal*, Vol. 17, Winter Special Issue, pp. 27-43.

Triandis, H.C. (1989), "The self and social behavior in differing culture contexts", *Psychological Review*, Vol. 96 No. 3, pp. 506-20.

Trussler, S. (1998), "The rules of the game", *The Journal of Business Strategy*, Vol. 19 No. 1, pp. 16-19.

Tyler, T.R. (1999), "Why people cooperate with organizations: an identity-based perspective", in Sutton, R. (Ed.), *Research in Organizational Behavior*, Vol. 21, JAI Press, Greenwich, CT, pp. 201-46.

von Hippel, E. (1994), "'Sticky information' and the locus of problem solving: implications for innovation", *Management Science*, Vol. 40 No. 4, pp. 429-39.

von Krogh, G. (1998), "Care in knowledge creation", *California Management Review*, Vol. 40 No. 3, pp. 133-53.

Weiss, L. (1999), "Collection and connection: the anatomy of knowledge sharing in professional service firms", *Organization Development Journal*, Vol. 17 No. 4, pp. 61-77.

Wenger, E., McDermott, R. and Synder, W. (2002), *Cultivating Communities of Practice*, Harvard Business School Press, Boston, MA.

West, P. and Meyer, G.D. (1997), "Communicated knowledge as a learning foundation", *International Journal of Organizational Analysis*, Vol. 5 No. 1, pp. 25-58.

Appendix. Questionnaire – Perceived payoffs of sharing knowledge

The purpose of this survey is to collect opinions on how you think you will be affected by the various joint decisions between yourself and the rest of your peers with regard to contributing knowledge to the electronic discussion. There are no right and wrong answers. Please respond to every question in this survey.

Table AI

Section 1: Assuming that BOTH you and all your peers contribute knowledge, ideas, questions and answers to the electronic discussion board						
1	How do you think this situation will affect your level of understanding of the module?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
2	How do you think this situation will affect your final grade of the module?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
3	How do you think this situation will affect your self-worth?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
4	How do you think this situation will affect your sense of recognition among your peers?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
5	How do you think this situation will affect your level of rapport with your peers?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
Section 2: Assuming that you are the only one who contributes knowledge, ideas, questions and answers to the electronic discussion board but NONE of your peers does						
6	How do you think this situation will affect your level of understanding of the module?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
7	How do you think this situation will affect your final grade of the module?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
8	How do you think this situation will affect your self-worth?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
9	How do you think this situation will affect your sense of recognition among your peers?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
10	How do you think this situation will affect your level of rapport with your peers?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
Section 3: Assuming that ALL your peers contribute knowledge, ideas, questions and answers to the electronic discussion board but you DO NOT						
11	How do you think this situation will affect your level of understanding of the module?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
12	How do you think this situation will affect your final grade of the module?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
13	How do you think this situation will affect your self-worth?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
14	How do you think this situation will affect your sense of recognition among your peers?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
15	How do you think this situation will affect your level of rapport with your peers?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐

(continued)

Table AI

Section 4: Assuming that NEITHER you nor any of your peers contribute knowledge, ideas, questions and answers to the electronic discussion board						
16	How do you think this situation will affect your level of understanding of the module?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
17	How do you think this situation will affect your final grade of the module?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
18	How do you think this situation will affect your self-worth?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
19	How do you think this situation will affect your sense of recognition among your peers?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
20	How do you think this situation will affect your level of rapport with your peers?					
	(1) Lose a lot	(2) Lose some	(3) Neutral	(4) Gain some	(5) Gain a lot	☐
	Thank you					

Accountability and demonstration of the value of information services in South African law firms

Olwyn Garratt and
Adeline du Toit

The authors

Olwyn Garratt is Information Specialist at Fairbridge Arderne & Lawton, Cape Town, South Africa.
E-mail: info@fairbridges.co.za
Adeline du Toit is Professor at Rand Afrikaans University, Auckland Park, South Africa. E-mail: asadt@lw.rau.ac.za

Keywords

Information, Value, Law, Financial accounting, Audit, South Africa

Abstract

The value of library and information services in the incorporated South African law firm was investigated with regard to accountability to corporate management. A cost accounting exercise was developed and tested in seven South African law firms of varying size. Cost per practitioner was calculated in order to correlate data from the participating organisations so that average relative spending might be determined. Attempts to relate the unit cost of library and information services to use and usefulness were inconclusive and these efforts were unable to demonstrate the value of the corporate investment. Recognised business practices relating to corporate accountability were considered with regard to the relevance to corporate support services. These included ISO 9000 and the practice of internal auditing. An information services audit was proposed in accordance with a recognised management process.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 3 · 2003 · pp. 130-137
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310472624

Introduction

In 1995 the law firm of Baker & McKenzie announced that its Chicago office was terminating the contracts of many of its support staff and was outsourcing its entire law library services. Baker & McKenzie was engaged in a radical restructuring or re-engineering of key business processes and resources were reallocated in the light of new operational objectives.

The news shocked information professionals in many parts of the world. Outsourcing the library operations to competing information intermediaries challenged the previously undisputed role of in-house librarians to meet the practitioners' information requirements. In addition, their decision suggested that the consultants and decision makers in this particular situation were either ignorant of the substantial literature on the value of information and information services to an organisation, or they disregarded it.

The reconstruction at Baker & McKenzie was not an isolated incident and closures, downsizing and outsourcing of corporate information services continued into the new century (Merrill, 2001). Professional responses to this situation range from marketing the potential value of library and information services to measuring actual performance by way of increasingly sophisticated metrics. This article reports on an approach that incorporates recognised business practices to the evaluation of corporate library and information services.

Study parameters and strategy

The authors of this report were concerned with the determination and demonstration of the value of library and information services in a South African law firm at the beginning of the twenty-first century. An investigation of service evaluation suggested the following research questions:

- How did the nature of the corporate entity influence the determination of the value of its information support services?

Received 12 March 2002
Revised 16 September 2002
Accepted 1 October 2002

- To what extent did existing performance models and standards offer useful guides to measuring value?
- To what extent could financial accountability contribute to the perception of the value of corporate information services?
- How did the information professional determine that the information services met the information needs of users?
- Was it possible to determine return on corporate investment with regard to library and information services?
- What controls were in place to ensure that operational procedures met the required operational standard?

The authors assumed that the answers to the questions above would indicate the perception of the value of information services in South African law firms and would suggest strategies to demonstrate this value to corporate management. In addition, they expected that the findings of these investigations might indicate if South African law firms were vulnerable to outsourcing or to closure.

The research study expanded into a series of studies that analysed and reported various attempts to demonstrate the value of library and information services to corporate leadership. Findings were based on observations of certain operating procedures in a Cape Town law firm seen in relation to those in comparable organisations. Colleagues in South Africa were approached individually and collectively for assistance by way of surveys, questionnaires and electronic mail communications. The leadership of the South African Organisation of Law Libraries (OSALL) agreed to permit a number of online surveys to be held via the organisation's online listserv in 2001 in order to assist in this study. Individual responses were submitted off the list so that confidentiality could be maintained, but summaries were published so that subscribers to the listserv had access to the results of the surveys.

Some of the findings were presented at the Law Librarian Symposium organised by the Institute for International Research in Johannesburg, South Africa in November 2001.

Findings

Corporate entity and determination of value

Core business processes with regard to the incorporated law firm in South Africa were identified with the provision of legislative and judicial material for legal practitioners. The function of the information services in this environment was to create reliable systems that provided access to appropriate and relevant information sources. The systems were judged according to the ease and effectiveness with which the end-user gained access to the information resources in the organisation and the assurance of the accuracy of these resources. Performance objectives were also identified in relation to accuracy and response time. It was seen that the information resources of the private law firm library had to be available and accessible to information users at all hours without the assistance of the information professional. This had implications both with regard to the organisation of resources and the provision of training of information users.

The fact that users of information in the incorporated legal practice were also its shareholders was seen to impact on certain management and operational objectives. Multiple constituency models that were seen to be relevant in evaluating services where user requirements were significantly different from management requirements had less application in the private or incorporated environment. User satisfaction could not be separated from corporate identity and the information professional was expected to be accountable with regard to both service quality and financial responsibility.

Evaluation and performance models

Performance literature suggested that existing performance models and standards offered useful guides to measuring value. In this research study modelling was seen to be helpful in integrating principal business processes at a conceptual level. Its usefulness as a framework for evaluating library and information services at operational level was, however, doubtful. The introduction of performance indicators drew attention to the relationship between measures of input cost, for example, and the use made of a product or service. This had implications for measuring operational efficiency and effectiveness, but there was no evidence to suggest that the measurement of performance against defined performance indicators was sufficient to determine or demonstrate the value of the services to corporate management.

Financial accountability and the perception of value

The consideration of the extent to which financial accountability contributed to the perception of the value of corporate information services constituted a significant study of cost accounting. An empirical study, known to participating organisations as the Infospend study, was conducted in seven South African law firms during the financial year 2000/2001. Participation was by open invitation on the online listserv of OSALL.

Objectives of the Infospend study

The primary objectives of the exercise were:

- to identify the information resources that were required to support the information services provided to legal practitioners in a South African private law firm;
- to capture data relating to the cost to the law firm of providing these information services during the course of the financial year;
- to investigate whether there was any correlation in patterns of information spending in South African law firms; and
- to test whether applying a cost per practitioner calculation to data from organisations of differing size would yield comparable data.

The secondary objectives were:

- to analyse relative spending on print-based and electronic media;
- to determine the cost of the labour component of the information services in an organisation;
- to determine whether cost per practitioner data could be applied to drive a cost benefit analysis, or alternatively drive an operational value study; and
- to contribute towards a culture of data sharing that might result in benchmarking certain operations and developing minimum operational standards and best practices to guide information professionals in South African law firm libraries and information centres.

The cost per practitioner indicator was [redacted] organisations of differing size. User was defined as each income-generating practitioner – including candidate attorneys – for whom information services were provided; and cost was understood to encompass the cost to the organisation of information resources for practitioners in supporting the work of fee earners. Costs included net price of all information expenses for which the organisation was invoiced and gross amount paid to information staff, including benefits. Infospend specifically excluded certain costs associated with supplying and maintaining information technology services available to the organisation as a whole. Excluded also was the shared cost of maintaining the general premises with regard to rates, rental, lighting, cleaning services, catering, and administrative support.

Results of the Infospend study

The findings of Infospend were unspectacular. The number of participants (seven) was too small a sample for the data to be able to express fully the South African situation. There was very little correlation in the data and nothing against which to measure the validity of the values. It was expected that economy of scale would disadvantage the smaller organisations. It was also anticipated that there would be distinct differences between organisational allocation of resources on information services in line with cultural or political differences. Both these factors would have impacted on the results, but with a small sample there was no way of determining which of the two was the more significant. Participation in the study was voluntary and data related to organisations where information services were well managed and monitored. The results were seen, therefore, to be both incomplete and skewed towards technically and professionally supported information services.

The core application of the Infospend ratio was the determination of the relative cost of maintaining an information service. It was accepted that inflationary pressure would render the figures out of date and therefore irrelevant beyond the year of study. The description of data in terms of ratios and percentages was therefore seen to be a more useful guide to relative spending.

Print-based resources remained the backbone of the traditional South African law (see Figure 1). Even when material was available digitally and was accessed for its sophisticated search capabilities, many practitioners preferred the flexibility of printed texts when they were required to skim large sections of text, or when they wished to take texts into consultations. Expenditure on print-based resources ranged from 37 per cent to 53 per cent of the total amount spent on information services in the sample group for the financial year 2000/2001, with the median at 40 per cent and the average 42 per cent.

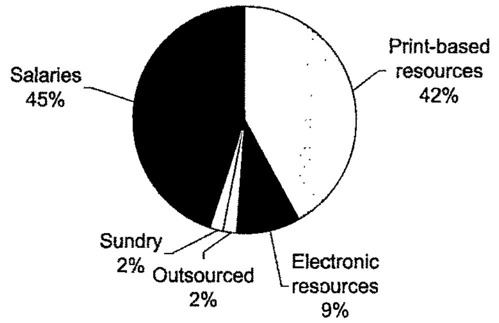
Expenditure on electronic information sources ranged from 4 per cent to 20 per cent of the total amount spent on information services in the sample group. Of the seven organisations that supplied data, five spent less than 10 per cent of their annual information service budget on electronic subscriptions.

Library and information services that were outsourced in many South African law firms during the period included loose-leaf updating, book cataloguing, document delivery, current awareness and alerting services, and legal and general research.

The amount allocated to sundry items like the cost of binding journals and the cost of special stationery and library items was generally low. The Infospend participants were not asked to submit data relating to general overhead expenses.

Salary was regarded as the cost to the company of employing its information professionals and included contributions to medical aid, pension or provident fund and any other benefits. It also included conference fees and membership fees of professional organisations. It was sometimes more difficult to obtain figures relating to the cash value of benefits than it was to obtain salary figures. Participation in group benefit schemes, for example, was not always reflected on a salary advice notification and precise details had to be obtained from human resources management. Expenditure on salaries and benefits of information professionals ranged from 31 per cent to 54 per cent of total information expenditure in the organisations studied.

Figure 1 Average relative spending 2000/2001



Across the seven participating organisations the average cost to the law firm of supplying library and information services to its legal practitioners in private practice was ZAR7,324.57 (about USD950) per practitioner for the financial year 2000/2001.

Application of the financial accountability exercise

Infospend tested a method of data capture across organisations of varying size. This provided a platform from which comparative studies and benchmarking was made possible. Infospend also provided an aggregation of core data against which to measure current and projected future spending patterns. This vested greater control over financial records in the hands of the information professional and promoted accountability. Improved capability to establish relationships between types of information expenses could be used, for example, to determine the relative expenditure on print-based and electronic resources, or to track departmental spending, or to position labour costs in relation to the overall information expenditure.

Determining the cost of maintaining a corporate information service was seen to be a useful point of departure for other studies in service evaluation. Follow-up studies that were indicated were:

- an investigation of cost effectiveness of the service;
- a detailed analysis of the exploitation of a key resource, staff time; and
- a consideration of cost recovery as a visible sign of added value.

Determination of the information needs of users

One of the studies that followed from the Infospend exercise investigated the perception that cost effectiveness could be measured in relation to service penetration. This was seen to relate directly to the assumption that evaluation of services must take into account the information needs of its users. The authors devised an operational value study in an attempt to ascertain use and usefulness of information resources and services to the customer. For a period of one month all information and legal practitioners in a Cape Town law firm were asked to log their use of information resources and services. Practitioners were given the opportunity to identify problems and deficiencies with regard to information resources in special areas of practice, and to articulate the degree of satisfaction with information services.

The results were inconclusive. The actual use that was made of information resources and services during the given period did not appear to correlate with the perceived value of the resources that was articulated during interviews. The significance of the study was seen primarily in its success as a marketing exercise; the outcome a commitment to customisation of information services in an effort to develop the perceived value of the services to the individual information users.

Return on corporate investment with regard to library and information services

The authors considered the possibility of determining return on capital employed with regard to library and information services. Claims in the literature for financial return on investment suggested that information services could become profit generating. These claims were explored in the context of the South African law firm with regard to the practicality of monitoring those information services where costs could be recovered. It was assumed that this was a practice that would clearly demonstrate the value of library and information services to corporate management. Cost recovery was associated with the cost of labour to perform various services and operations and transaction details were noted as the time taken over the activity was logged.

There was no problem with the recording or analysing of data in order to determine the actual cost of library and information services. What was shown to be problematic was the implementation of cost recovery practices in the context of corporate library and information services. Legal and ethical difficulties were revealed with regard to the reselling of information that was copyright protected, for example. There was also evidence from colleagues to suggest that cost recovery and generation of profit through the sale of information services might have a detrimental effect on perceptions of the role of corporate services. Situations arose where inter-departmental charging for the use of corporate library and information services led to a dramatic decline in the use that was made of these services (Toth, 2001).

Controls and operational standards

The final question with which this investigation of evaluation was concerned was the provision of control mechanisms to ensure that operational procedures met the required operational standards. In terms of South African statutory law it was seen that incorporated organisations were obliged to prepare a set of audited financial records for shareholders. However, while legal practices were subject to an annual external audit, there was no evidence that support services like library and information services were expected to supply unit reports for the company audit or even to conform to certain minimum standards.

The findings with regard to financial accountability as a result of the Infospend study suggested that other areas of operational activity should be subject to internal scrutiny. It was suspected that information professionals in private law firms were unfamiliar with formal performance measurement and this was tested in an informal electronic survey conducted on the OSALL listserv in November 2000. Information professionals at 26 organisations were sent a short questionnaire by e-mail in which they were asked to comment on some aspects of performance measurement and internal control procedures. The results appeared to confirm the perception that information services in South African law firms were not generally subject to formal evaluation procedures. In the apparent absence of formal performance standards and mechanisms to demonstrate accountability, the researchers considered two international practices for the determination of value. These were accreditation in line with the International Organization for Standardization's ISO 9000 standard, and the practice of internal auditing. The systemic approach exhibited in both these practices suggested the merit of developing a similar procedure for the evaluation of corporate library and information services, an information services audit.

ISO 9000: quality management

The ISO 9000 suite was published in 1987 as a guide to quality management systems. This was the first ISO standard to be concerned with process rather than with product (ISO Online, 2001). It was understood to be the means by which an organisation enhanced customer satisfaction by meeting customer demands while at the same time satisfying regulatory requirements. Compliance with the standards developed as part of the ISO 9000 suite indicated a commitment on the part of an organisation to conform to certain operating practices. It also indicated the corporate intention to commit itself to continual improvement in quality management. The ISO standard ISO 9001: 2000 6.1 identified both the resources needed to support the quality system as well as those resources needed to improve it (Praxiom Research Group, 2000). In December 2000 the system standards in ISO 9001, 9002 and 9003 were merged into a single requirements standard ISO 9001: 2000 (ISO Online, 2001).

Internal auditing

> Internal auditing is an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes (IIA, 2000).

The internal audit was seen to be a mechanism for evaluating internal systems. Its scope could be defined in relation to quality of performance and management effectiveness (Barlow *et al.*, 1995). While the internal audit was acknowledged to be a voluntarily exercise, the practice of internal auditing was governed by the Institute of Internal Auditors (IIA, 2000) and local affiliates in most countries. The significance of the internal audit was seen to lie in the objective analysis of procedure and performance, where an independent examiner (ideally) verified the accuracy of documentary evidence.

Information services audit

The proposed information services audit is distinguished from the information audit associated with the work of earlier authorities. Burk and Horton (1988) approached the exercise from the perspective of inventory. Their methodology identified and mapped information resources in an establishment. Orna's (1990) information flow analysis extended the scope of inventory to account for those processes where value was added and information created. Buchanan and Gibb (1998) devised a strategy to co-ordinate these diverse approaches.

The information audit is typically undertaken in order to assess the value and potential value of corporate information to an organisation. The information services audit, on the other hand, takes its cue from internal auditing practices and approaches the analysis from the more uncompromising perspective of the corporate balance sheet. It is suggested that there is a strong case for the incorporation of internal auditing principles and practices in the traditional reporting structure within the organisation. It is proposed that the information services audit embodies the search for a methodology to evaluate information services. It is furthermore claimed that the information services audit embodies recognition of accountability as the critical factor in the demonstration of the value of corporate information services.

This paper concludes with an illustration of how library and information services in a law firm might be systematically prepared to conduct an annual information services audit. This framework is an adaptation of the ten-step management process devised by auditors with Deloitte and Touche to assist their clients to prepare for internal auditing. The process was identified as follows (Barlow *et al.*, 1995):

- *Step 1.* Understand the unit's business.
- *Step 2.* Establish what needs the unit is or should be satisfying.
- *Step 3.* Define the unit's mission.
- *Step 4.* Identify the key activities required to achieve the mission.
- *Step 5.* Establish performance objectives for these key activities.
- *Step 6.* Assess the risk relating to these performance objectives.
- *Step 7.* Decide what control strategies to pursue.
- *Step 8.* Implement appropriate control strategies.
- *Step 9.* Monitor and evaluate actual performance.
- *Step 10.* Review performance objectives.

An approach to the information services audit in a corporate law library

Understand the unit's business

The business of the information services unit in an incorporated law firm is identified as the provision of legislative and judicial information to support the work of the practitioner.

Establish what needs the unit is or should be satisfying

The business of establishing what needs the unit should be satisfying is viewed both with regard to its users and in conjunction with fiscal responsibility to the other stakeholder in the unit's operations, its shareholders. Since shareholders in an incorporated law firm are also its practitioners there should be no conflict of interest in satisfying the requirements of both stakeholder groups.

Define the unit's mission

The mission of the information services in an incorporated law firm is seen to be derived from an understanding of the unit's business and the core production processes in relation to stakeholder interests. The mission is vested in the creation and maintenance of reliable systems to provide access to accurate and relevant legislative and judicial information resources. With regard to financial accountability, the mission is to manage the allocation of money and manpower resources.

Identify the key activities required to achieve the mission

Key activities are identified as those that support stakeholder interests with regard to legal information for practitioners and also with regard to optimising the corporate resources. The key activity that provides for the needs of shareholders is the maintenance of financial records and supporting documentation to account for the financial investment of the organisation in its library and information services.

Establish performance objectives for these key activities

Performance objectives with regard to the maintenance of sound financial records include the methodical recording of all expenses and practical arrangements for accounts to be settled punctually. An example of a performance objective might be that invoices are processed for payment on the same day as they are received. This would be regarded as the optimal standard and performance might be measured with regard to the number of times the standard is met within a given period. Another performance objective might be the generation of financial reports within one week of the end of the financial year.

Assess the risk relating to these performance objectives

Risk is seen to operate in all areas where process is critical and where failure to adhere to performance standards might be detrimental to corporate operations. Unsatisfactory response time with regard to payments to suppliers can, for example, compromise the reputation of the information professional and the organisation. Failure to keep accurate financial records might result in ignorance of the financial state of affairs and effectively undermine efforts to detect and rectify problems.

Correctly interpreted, service complaints are seen to hold important lessons for analysis and management of risk.

Decide what control strategies to pursue

Control strategies centre on developing service quality assurance such that performance objectives can be achieved. Assurance is seen in terms of effectiveness, operational efficiency, reliability of financial reporting, and compliance with applicable laws and regulations. Assurance is further identified as the capability for a system to function efficiently and effectively if the work passes into the hands of a substitute operator. ISO 9001:2000.4 identifies the stages in the development of systemic requirements for quality assurance in terms of the following:

- establishment and description of the operational processes;
- documentation of procedures; and
- maintenance of records.

Risk with regard to delivery and proper record keeping is managed with the introduction of procedural checklists and with scrupulous attention to cost accounting and reporting. The aims of procedural and reporting control strategies are to achieve optimal accuracy in the systemic and systematic organisation of information resources and to make provision for substitute service operators. Follow-up procedures might, for example, be developed to ensure that accounts submitted for payment are paid within a prescribed period and that acknowledgement of payment is recorded.

Implement appropriate control strategies

Implementation is a management function by which proposed control strategies are made operational. Procedures are devised to accommodate customer expectations and define managerial responsibilities both within the unit and inter-departmentally.

Monitor and evaluate actual performance

Objective methods of evaluation involve the analysis of documentary evidence that measures operational activities against the standard of optimal performance. Auditing typically centres on the inspection of documents that validate the annual financial statements. An information services audit must take cognisance of the requirement for documentary evidence of performance success and failure.

Review performance objectives

Performance objectives are subject to review in the light of operational results. Where optimal performance (100 per cent delivery) is judged to be achievable – the processing of invoices on the day of receipt, for example – the relevant performance objectives incorporate this standard into management practice. Where optimal performance is not achievable, the objectives and procedures are reviewed to incorporate realistic goals.

Conclusion

An investigation of the evaluation of library and information services in a South African law firm indicated that there was a need to demonstrate operational excellence to corporate management. This further indicated that evaluation of support services in a business environment should be considered in the light of corporate business measures of accountability, specifically quality management and internal auditing.

An information services audit embodying the business practice of internal auditing in the light of the demands of quality management systems was proposed as a statement of accountability and a demonstration of the value of information services in South African law firms.

References

Barlow, P., Helberg, P., Large, N. and Le Roux, K. (1995), *The Business Approach to Internal Auditing*, Juta & Co Ltd, Cape Town.

Buchanan, S. and Gibb, F. (1998), "The information audit: an integrated strategic approach", *International Journal of Information Management*, Vol. 18 No. 1, pp. 29-47.

Burk, C.J. and Horton, F.W. (1988), *Infomap: A Complete Guide to Discovering Corporate Information Resources*, Prentice-Hall, Englewood Cliffs, NY.

IIA (2000), The Institute of International Auditors, home page, available at: www.theiia.org (accessed 20 September 2000).

ISO Online (2001), International Organization for Standardization, home page, available at: www.iso.ch/iso/en/aboutiso/introduction/index.html (accessed 8 July 2001).

Merrill, R. (2001), *BUSLIB-L Business Librarians' Discussion List*, BUSLIB-L@LISTSERV.BOISESTATE.EDU, 19 January, re: corporate library shutdowns – summary list.

Orna, E. (1990), *Practical Information Policies: How to Manage Information Flow in Organizations*, Gower, Aldershot.

Praxiom Research Group (2000), *ISO 9001: 2000 Translated Into Plain English*, available at: http://praxiom.com/ (accessed 14 April, 2001).

Toth, P. (2001), (Paulette_Toth@ny.kirkland.com), e-mail to Olwyn Garratt re: billable hours, 26 June 2001.

First steps towards providing the UK with health care information and advice via their television sets: an evaluation of four Department of Health sponsored pilot services

David Nicholas, Paul Huntington
Peter Williams and Barrie Gunter

The authors

David Nicholas, Paul Huntington and **Peter Williams** are all at the Digital Health Research Group, Centre for Information Behaviour and the Evaluation of Research (ciber), Department of Information Science, City University, London, UK. E-mail: nicky@soi.city.ac.uk
Barrie Gunter is at the Department of Journalism Studies, University of Sheffield, UK.
E-mail: b.gunter@sheffield.ac.uk

Keywords

Digital, Interaction, Television, Health care, Evaluation, United Kingdom

Abstract

Provides a summary of a Department of Health funded research study investigating performance and impact of four pilot digital interactive television services in the consumer health field. These were launched in various locations in the UK in 2001. Text and video, interactive and transactional services were featured. Pilots were investigated using a combination of research methods. The four pilots' performance varied, but overall there was sufficient evidence to suggest that consumer health digital interactive television has a healthy future.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 3 · 2003 · pp. 138-154
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310472633

Introduction

In 2001, the Department of Health (DoH) launched four pilot projects to explore the feasibility and effectiveness of health information and advice services supplied to the public via digital interactive television (DiTV). At the same time, the DoH commissioned a research team comprising academics from City University and the University of Sheffield to undertake a substantial evaluation of the performance of the pilot DiTV operators. This research incorporated a suite of methodologies through which a variety of types of data were collected.

The four DiTV pilots offered distinctive services. Although there were some overlapping features among these services, they had many more qualities that are distinctive. These qualities included the type of platform on which a service was transmitted, the amount and nature of content, the presentation formats used, and the degree of interactivity involved in each case. The four consortia were: Communicopia, Flextech Telewest – Living Health, Channel Health and DKTV (A Different Kind of Television).

The service developed by Communicopia aimed to extend the reach of the NHS Direct telephone and online service onto digital television. It was launched (in November 2001) to an audience in Kingston upon Hull and the East Riding of Yorkshire via Kingston Interactive's (KIT) local ADSL telephone network, and later, on Video Network's HomeChoice platform, to viewers in London. The service enabled TV viewers to access key sets of data from the NHS Direct Online Web site, including details of over 400 illnesses and medical conditions, support organisations, and advice about living a more healthy life. Utilising a mixture of existing text-based material and specially produced video clips, the service provided users with over 20,000 pages of information, and video-on-demand

---

The full report on which this summary article is based is: *First Steps towards Providing the Nation with Health Care Advice and Information via their Television Sets. An Evaluation of Pilot Projects Exploring the Health Applications of Digital*

Received 20 September 2002
Revised 21 October 2002
Accepted 10 November 2002

offering both the perspective of medical professionals and that of patients. The service also provided users with interactive options such as health quizzes and an SMS text messaging reminder service for children's vaccination dates. This service was promoted as NHS Direct Digital.

Flextech Living Health Ltd and partners launched a pilot service in June 2001 featuring a range of digital TV health applications to a potential average audience of 45,000[1] in the Birmingham area via the Telewest cable network. The applications included "NHS Direct in Vision" (talking to and actually seeing a nurse), a system for booking an appointment with a GP through the TV and a wide range (over 22,000 pages) of information pages covering local NHS services, healthy living, health conditions and treatments and a database of medicines. The pilot ran for six months and was then extended by Flextech Living Health for another six months.

Channel Health piloted a series of broadcast TV programmes (*Bush Babies*) to a national audience of over 5 million with linked interactive services via Sky. The programmes dealt with health (and financial) issues relevant to pregnant women and the interactivity enhanced and supplemented these by providing a range of text-based pregnancy and maternity related information. Channel Health presented a text-based information service linked to special broadcasts in its regular schedule on the Sky Digital platform. It experimented, on a local basis, with a package of other interactive services for pregnant women comprising mainly e-mail support links between users and health professionals.

DKTV Ltd developed a service for the HomeChoice platform, launched initially to Newham residents. This service aimed to work together with public sector organisations to provide national and local interactive television content. The service relied on the HomeChoice video-on-demand, enabling users to select and find out more about the local services on offer. The video clips were presented by local service employees and provided users with the option to press a button to forward their details to local service providers. Originally intended to be rolled out on cable TV and broadband platforms in London, in the end only the broadband version of the service was launched and evaluated. This service was transmitted to approximately 500 potential users on Video Networks Limited's HomeChoice service in Newham.

Aims

These were:

- To determine whether digital interactive television "worked" in a consumer health context. Did it, for instance, deliver the numbers, the particular audience profile, the ease of access and the hoped for health outcomes?
- To evaluate and compare the four DoH contracted consortia's approaches to the delivery of health information on DiTV. To establish which approaches worked, with whom, and which of the approaches worked best.

The organisation of this paper follows the main performance indicators originally specified by the Department of Health in its briefing document. Most of these can be applied to each of the four consortia in turn. Indicators such as delivery of NHS services in a domestic setting by a commercial organisation, the costs of different DiTV services, and the effects of approaches used by broadcasters to combine NHS and non-NHS health programmes and material, are examined in a separate section of this report, taking all four DiTV consortia together.

The key DoH evaluative criteria were:

- volume and pattern of use;
- users' experience and perceptions of the service;
- the range, quality and appropriateness of the services offered;
- co-ordination with other health services available;
- impact on NHS of supporting the service;
- impact on users' use of health services;
- impact on users' health status;
- impact on their perceptions of the NHS.

In addition, some comparisons were made between use of digital interactive television (DiTV), as a platform for health information, and other technologies such as touch-screen kiosks and the Internet.

A number of factors made the meeting of the research objectives a difficult and challenging task because:

- The four consortia did not start at the same time, which made it difficult to compare the impact on each consortium of a health scare, seasonal illness or item of news.
- The periods over which the evaluations of the different pilots were conducted varied, giving some consortia longer exposure.
- Clearly, DiTV is a new platform that represents a development in the nature of television as a technology and as a viewing medium for the audience at home. The use of DiTV as a communications channel through which to transmit health information and advice – as evidenced in the current pilot exercise – is a pioneering innovation. Even on an established platform, it may take some time for a new service to become established in terms of its market share. In the case of the DiTV experiment, both the services and platforms were relatively new, not just in terms of content, but also in terms of the way users were invited to engage with the services being offered. While people may be accustomed to entering "interactive" mode when using the Internet, this is not true of television viewing. The long-conditioned psychological orientation towards television is one of passive reception – with interactivity limited to channel surfing via the remote control, video recording of off-air broadcasts for later viewing, and latterly, choice of camera angles at sports broadcasts. Full-on interactivity with the television that involves content mining or two-way communications, with the viewer being a sender as well as receiver of messages, is a new phenomenon for most viewers that will entail some re-conditioning of their orientation towards the medium.
- The four DiTV consortia offered different products to different audiences in different places – Birmingham, Hull, London, or, in one case, the whole of the UK. Some were mostly text-based, while others offered significant video material. Levels of interactivity varied from searching of text content – a kind of online encyclopaedia of health information, through video-on-demand – to personal medical records keeping, online appointments booking and two-way, live and interactive, personal health condition diagnosis. All these distinctive features meant that we were not always comparing "like with like".
- Data quantity and quality varied between consortia. While it was originally intended to centre much of this evaluation exercise on computer log data that gave measures of real-time behavioural use of each service, this proved not always to be possible. No log data at all were produced by one consortium (Channel Health), while only summary data were made available for another consortium (DKTV). This meant that the comprehensive data comparisons we wished to make could not always be conducted.
- Access to users or potential users also varied between consortia. One significant factor in this context (and also related to log data availability) is that the DoH-contracted consortia did not own or control subscriber databases for the various platforms on which their services were transmitted. The commercial organisations that owned the transmission platforms and controlled access to subscribers were not always willing to give access to commercially sensitive data from these potential digital TV health audiences. This meant that the data could not always be triangulated to best effect.

In view of the above, the research team had to modify the original research design as certain methodological options and envisaged data sources were closed down. Where real-time log data were not available to measure user behaviour for these services, self-report data were obtained instead via ad hoc surveys with users or potential users. Where direct telephone access to viewers and users was not possible for lack of subscriber telephone number information or permission to speak directly to subscribers from platform owners and operators, postal or online self-completion questionnaires were used instead.

Methodology

A multi-method approach was used by design and by necessity. In the advance planning stages, it was recognised that the research should attempt to study real-time user behaviour in relation to these DiTV services, users reactions, and links between patterns of use and reactions and perceived impacts. Circumstances that arose during the course of the pilot exercise – and already outlined earlier – meant that standardised data could not be collected across all consortia. Nonetheless, the evaluative research maintained its commitment to assess use and user reactions as fully as possible throughout.

Log analysis

Analysis of digital logs was fundamental to this study. Logs were used to provide a bottom-line assessment of how much these DiTV health information services were used at all by people who subscribed to the television distribution systems that carried them. The great advantages of the digital logs are not simply their size and reach, although the dividend here is indeed a rich and unparalleled one. Just as important is the fact that they are a direct and immediately available record of what people have done: not what they say they might, or would, do; not what they were prompted to say; not what they thought they did. The data are unfiltered and speak for themselves. Log data enabled the measurement of overall numbers of users for the interactive services, trends in usage over the pilot period, the amount of time users spent visiting sites, and the types of content they viewed. Detailed log data were obtained in electronic form for two consortia – Living Health and Communicopia. In the latter case, such data were available for the use of text-based and video-based content. Summary log data only were provided for DKTV and Channel Health generated no log data.

Industry audience data

Viewing statistics produced by BARB (Broadcasters' Audience Research Board) were utilised in the case of one consortium – Channel Health. These data indicated how many viewers watched the consortium's broadcast programme output linked to the project. A series of programmes targeted at women on maternity issues was broadcast as part of the regular Channel Health schedule on Sky Digital. Viewing of these programmes was measured by BARB's audience measurement service. Viewing data are produced daily from a national panel of over 5,000 households. All TV sets and other related equipment, such as video-recorders and set-top box decoders, are linked to a data collection device installed in the home that automatically records which channel is tuned into when a TV set is switched on. Video recorded viewing is also registered. The presence of individual household members when a TV is switched on is recorded via a handset.

User reactions

Ad hoc user surveys (online, telephone and postal questionnaires) were carried out in respect of all consortia that were designed to supplement data obtained from real-time measures of viewing. These surveys questioned identified users of each DiTV health service about their experiences, usage and opinions. Questions probed issues such as ease of use and navigation, usefulness of information, the way information was used, perceived impact on own health or dealings with health professionals, and trust and authority of the information.

With Living Health, data were obtained from two postal surveys conducted shortly after the service was launched and mid-way through the pilot period. Questionnaires were distributed along with promotional literature to Telewest cable TV subscribers in Birmingham and yielded return samples of 450 and 723 respondents respectively.

With Channel Health, data were obtained from two user surveys conducted respectively during the early part and the later part of the pilot period. The first survey was conducted by Channel Health in part by post (n = 114 respondents) and in part via an online questionnaire (n = 322 respondents). The second survey was conducted in partnership with Channel Health by telephone interview (with fieldwork by Continental Research) and yielded 251 respondents.

With Communicopia, a postal questionnaire survey was sent to all potential subscribers to the Kingston Interactive Television platform in Hull, and 1,184 usable responses were returned.

With DKTV, a single telephone interview survey was carried out shortly after the launch of its Newham service carried on the HomeChoice broadband network in London. At the time of the research, there were 513 broadband subscribers in Newham and all were approached for interview. Interviews were successfully conducted with 281, of whom 35 had reportedly used or watched the DKTV service.

In-depth interviews

The ad hoc surveys were supplemented in the case of most consortia with in-depth qualitative interviews with either users of DiTV services or health professionals involved with these services.

With Living Health, depth interviews were conducted individually with six of the staff fronting the InVision service. In-depth interview data were also obtained from health professionals concerning the GP appointments booking service. Twenty in-depth interviews were conducted with Living Health users identified through one of the ad hoc surveys, four of whom had also used InVision. A further 31 InVision users were identified through caller logs, 27 of whom responded to telephone interviews and four participated in face-to-face interviews. Further qualitative data were obtained from 14 Birmingham City Council employees about the Web version of the service carried on their employer's Intranet.

With Channel Health, qualitative data were obtained via the consortium among a small sample of pregnant women or young mothers and eight healthcare workers. These individuals were shown a demonstration of the Channel Health service and allowed to experiment with it themselves, before giving their impressions. Further in-depth telephone interviews were carried out with two pregnant women about the interactive services supplied by Channel Health.

Communicopia held consumer panels once a month from June 2001 to explore issues of usability, information content and presentation. Each panel meeting involved between 10 and 15 participants, some of whom repeat attended. The sessions lasted between 90 minutes and 2 hours. Participants were presented with demonstrations of the service and opportunities to use it themselves.

Usability research

Serco Usability Services Ltd was commissioned directly by the Department of Health to conduct qualitative research with small, convenience samples who were given the opportunity to use service demonstrators in Serco's observation laboratory. In all, 62 respondents were run across the four consortia. These data were examined alongside other data collected independently by the authors or in partnership with the pilot consortia.

Results

Use

Over the 12-month pilot, the four DiTV pilots were made available to a potential combined audience of 5 to 6 million households, equating to 11.5 to 12 million individual viewers. The only nationwide service, Channel Health, attracted aggregated audiences of around 2.8 million to episodes of its *Bush Babies* series over the duration of its pilot. Based on self-report data, it is estimated that 2-300,000 people availed themselves of one or other of the digital health services, a reach figure of 2 per cent. At first glance, this would appear to be a disappointingly low figure. However, why the reach figure is so small overall is because most of the base of approaching 6m was contributed by Sky, and the reach of Channel Health in percentage terms was small (though it reached the largest potential audience overall). On Channel Health, 9 per cent of respondents who had identified themselves as viewers of *Bush Babies* reported using the maternity guide – the enhanced text service that supported the *Bush Babies* programmes.

Hence the much healthier reach figures for Living Health and Communicopia of 30 per cent and 20 per cent respectively (see below) are significantly diluted by the performance of the service on Sky. Even DKTV, which operated on a smaller scale than any of the other consortia, achieved a reach figure of 35 per cent. The specialised nature of some of the services (i.e. pregnancy information) and the short time-span of their availability also needs to be taken into account in any calculation.

Individual service figures

Living Health was made available to an average of 45,000 subscribers. Over the six-month period monitored, the logs tell us that 13,718 different visitors (households) used the system. Based upon this figure it is estimated that around 30 per cent of potential users (i.e. "households", as wherever mentioned in this report) accessed the service during the period – a healthy figure by any standard, which shows the level of penetration these innovative health services are capable of achieving. This is especially true when one considers that, unlike daily news, for example, the kind of information/transaction offered was for ad hoc information needs. In consequence, subscribers may not have required any health-related services in the relatively short time of the pilot. The potential for growth appears there too, with well over eight in ten (84 per cent) of questionnaire respondents saying that they would be either likely to or very likely to access Living Health if the service continued to be broadcast. Interviewee respondents were equally enthusiastic: "It will definitely become a prime source of information for me if it carries on – and if it doesn't I will be disappointed". Although this finding did not quite square with the falling trend of use, the initial surge, and then decline, in usage may well have been due to its novelty value and early marketing efforts, and is probably unlikely to signify long-term stagnation.

Communicopia (NHS Direct Digital) was available to approximately 10,000 potential homes. Over the five-month period monitored 1,965 different households used the system. Based upon this figure, it is estimated that about 20 per cent of potential users accessed the service during the pilot.

In regard to Channel Health, BARB data indicated that *Bush Babies* episodes aggregated (across their repeat showings) audiences of over 300,000 in the first (six-week) phase, over 200,000 in the second (five-week) phase, and 2.3 million in the final (three-month) phase. According to self-report questionnaire data, 27 per cent of Channel Health viewers watched *Bush Babies*. This is quite impressive, given that the target audience was pregnant women, not only a low percentage of the population as a whole, but, presumably, a low number even of Channel Health viewers. Channel Health calculated that 160,000 out of 700,000 annual births in the UK could occur in Channel Health receiving homes.

Channel Health is estimated to have a monthly reach figure among Sky viewers of approximately 15 per cent. Given a Sky Digital audience base of around 5.7 million households then the audience of *Bush Babies* was estimated to be about 200,000 homes, or about 3.5-4 per cent of all Sky subscribers (assuming all Sky users receive Channel Health).

Finally, DKTV: during the two-month survey period 142 users availed themselves of the service, out of the 403 to 513 households receiving it – a reach figure of up to 35 per cent.

In comparing the performance of the pilots, Living Health performed particularly well. In terms of audience reach, Living Health appeared to perform much better than the Communicopia/NHS Direct Digital, the service with which it had most in common – reaching an average of 30 per cent of the potential audience as compared to its rival's 20 per cent. Adjusting the reach figure for the different operational period lengths, Living Health is estimated to have a higher figure by about one-and-a-half times compared to the NHS Direct service on Communicopia. The reach figure for both services declined after about the 35th day of operation.

Return visits

The data show that once someone has used a DiTV health service there is a good chance they will use it again. About 60 per cent of Living Health users said that they would use the service as needed. In fact, the logs showed that 41 per cent of Living Health users visited the service again during the pilot. Living Health users who first visited the channel in July/August, shortly after launch, on average visited the channel three times or about once a month. Considering, again, the ad hoc nature of the need and the fact that everyone knew this was a pilot, these are quite impressive statistics.

A slightly smaller proportion (37 per cent) revisited NHS Direct Digital over the period January to May 2002. It is also worth noting here that rate of return visiting may have been partly affected by (negative) changes to the positioning of Communicopia/NHS Direct Digital in the broadband environment in which it was transmitted. No logs were available for Channel Health, so the data are probably less reliable. However, subscribers were asked how often they watched the service and 56 per cent said they watched at least once a week, 20 per cent watched at least monthly and 24 per cent watched it infrequently. Return visits could not be calculated for DKTV.

Time online

Short online consultations proved to be the norm. Living Health viewers spent on average six minutes on a visit (session), whereas the figure for Communicopia/NHS Direct Digital was over seven minutes. Users viewing more pages in a session recorded longer session times. NHS Direct Digital users spent approximately 50-100 per cent more time on a visit as compared to Living Health users. This difference is thought to be due to the viewing of videos by NHS Direct Digital/ Communicopia users – video viewing is plainly more time-intensive. No data were available here for either Channel Health or DKTV.

Screens viewed

For the services for which logs were available, there was evidence that once people accessed a service they showed a significant degree of interest in it. In the case of Living Health, 39 per cent of users viewed more than 20 pages during a visit and these figures proved to be stable over time. In the case of NHS Direct Digital, 44 per cent of users viewed more than 20 pages, demonstrating, perhaps, a significant interest in what they saw. However, this service is a menu-heavy service and has a number of menu screens associated with both the video and text service.

There were high "failure" rates too. In the case of Living Health, 19 per cent of users viewed one to three pages and these users were unlikely to have penetrated past the menu screens and would not have viewed an information page, except for the daily news headlines. For Communicopia/NHS Direct Digital the equivalent figure was also 19 per cent. Note that this service was very menu rich and to reach a number of information pages users had to go beyond three menu pages.

Finally, logs also revealed that only 12 per cent of those accessing the Living Health InVision (Broadband nurse) service page actually completed a session (i.e. engaged in an online consultation with a nurse). These figures may provide evidence that early users were "checking out" the system for future reference, not having an immediate need.

Personal characteristics of the DiTV health consumer

Age/Gender

In the case of Communicopia/NHS Direct Digital, younger respondents and, interestingly, especially male respondents were more likely to use the text service as opposed to the video service compared to older and female respondents. Men aged 55 and under were just over one-and-a-half times more likely to use the text service than women 55 years and under. The relationship was also true of the video service. Furthermore, men over the age of 55 were about twice as likely to use the service compared to women under the age of 55. As for service preference, men reported a preference for videos over text.

For Living Health, older users tended to be men. A higher proportion of younger Living Health users (compared to NHS Direct Digital) were women. In the case of the InVision home nursing service men and women used the service equally, although for different reasons. Women tended to do so on behalf of others (particularly children) whilst men wanted answers to their own health problems (maybe the privacy of the home was an incentive).

Not surprisingly, given the nature of the Channel Health service (i.e. pregnancy information) those aged over 45 were four times less likely to use the service than younger viewers were. Women were twice as likely to use the service as were men. This still represents an encouraging interest in the service on the part of males. Interviewees all confirmed the interest of their partners in the programme and, indeed, how the content and information helped them understand and manage their situation: "we watch the programme together whenever we can – where (partner's name) is at work, he watches on his own later – or I watch it a second time, with him".

Social class

It would appear that DiTV attracts low-income users. This is encouraging in that it supports the argument that DiTV throws an ICT health lifeline to those who have been excluded from the digital revolution – the less well off and potentially socially excluded.

People living in an area with a low incidence of £20,000+ income earners were more likely to use the Living Health service. Respondents from wealthier areas were half as likely to use a DiTV text information service, as were those people who came from less well off areas. In addition, users from lower income areas were more likely to say Living Health was useful compared to users from higher income areas. It was the same for the other services too.

Communicopia/NHS Direct Digital users from postcode areas with a low incidence of

£20,000+ earners were about twice as likely to use the service. Channel Health users from middle and lower social classes were two to three times more likely to have viewed the service as were respondents identified as being from a higher social class.

Children

There was a high level of use of Living Health in areas where there was a higher incidence of 0-14 year olds. This finding could not be confirmed among users of NHS Direct Digital on KIT or for those using Channel Health's *Bush Babies* service. However, the researchers have found elsewhere (Nicholas *et al.*, 2001), high levels of usage of other health information services (especially touch-screen kiosks) among the young (under 15s).

Health concerns

What health topics consumers decided to view or what medical conditions they wanted to look up is plainly of major interest to health information providers everywhere. However, we need to be careful how we interpret these data as choice is determined by a number of factors – what content is provided, how visible or accessible that content is, what health topics interest users and what medical conditions they – or their family – may suffer from. Comparisons between channels are difficult because of differences in the content, media, audiences and interactive services provided. The general indications were that users turned to DiTV health services to address real information/health needs rather than to browse for recreation.

In the case of Living Health the sections that users appeared most interested in were the "Illness and treatment" section followed by "Women's health" and "Men's health". The illness and treatment section accounted for 36 per cent of all pages viewed. The most popular topics in the illness and treatment section were back pain, depression, impotence, Aids, and irritable bowel syndrome. Popular topics under Women's health were orgasm problems, dyspareunia, thrush and cystitis. For Men's health interesting topics proved to be impotence, premature ejaculation, sexual infections, gay sex and sexual health help. Clearly, the privacy of one's home appears to be the ideal environment in which to explore issues that may be too intimate or embarrassing to research via a publicly placed information terminal.

For Communicopia/NHS Direct Digital the "A-Z of conditions" was the most popular section by some margin and accounted for 57 per cent of text pages viewed. The second most popular section was "Not feeling well", and accounted for 13 per cent of pages viewed. Interviewees and questionnaire respondents for this project tended to stress their desire to avoid visiting a doctor: "If I find out that the problem is not serious I can avoid going to my GP. You have to make an appointment, it's a long way, and the doctors are over-stretched anyway." An established pattern of popular topics viewed emerged in the "A-Z of conditions" section from about February with diabetes, lower back pain, asthma, mellitus appearing in the top ten of subjects viewed in each of these months.

For Communicopia, the most popular on-demand videos were the "Foray for health", "Diabetes" and "Coronary heart disease". These three videos accounted for 42 per cent of topic videos viewed. Each topic was represented by a series of videos that the user could view independently. For topics where only one video was available, the hypertension (downloaded 54 times) and MMR videos (downloaded 44 times) were the most watched. There were no views of videos on testicular cancer or ulcerative colitis. The latter might be considered disappointing to the DoH, as there is some concern that men are not undertaking regular self checks to spot this condition early. This raises the issue of whether topic positioning in the digital service should be used strategically to help ensure important topics are viewed.

Role and impact of digital health information

Well informed consumers

It would seem that DiTV creates well-informed health consumers. Two-thirds of Living Health users (67 per cent) said that the information they obtained had either helped or helped them a lot in becoming better informed about their condition. Data from in-depth interviews confirmed this, with respondents enthusing about having information so easily to hand: "It has given me a whole new source of information, and right there at home." Similar findings came from Communicopia/NHS Direct Digital users; 90 per cent said they felt better informed about a condition after having used the service. Pre-launch focus group interviewees felt that people would be, as one put it: "much better informed about health matters".

Helps with the doctor

DiTV helps in dealing with the doctor. Well over half (55 per cent) of Living Health users queried the service for information about their consultation with the doctor either before, after or before and after their consultation; 40 per cent of Living Health users felt that the information they found had helped or helped a lot in their dealings with the doctor. This was also a theme among depth interviewees: "I now go to the doctors with a much better idea of what's wrong with me, and what I can ask about."

These are views echoed by NHS Direct Digital/Communicopia subscribers; 73 per cent of respondents felt that the information they found had helped a little or helped a lot in their dealings with the doctor. Just over one in four NHS Direct Digital users, 27 per cent, said that they would use the service to look for information that they would not want to discuss with their doctor. Plainly, this is an important role for DiTV health services.

And the same was true about Channel Health users. Interviewees felt that they were far better armed when they met their GPs, midwives and obstetricians, and praised the *Bush Babies* series for giving them an excellent knowledge base regarding their condition: "It gave me so much information that I know I wouldn't have got elsewhere – I don't go fishing for information in books – and it's easy to forget what the doctor tells you."

Used to put off a visit to the doctor

Over half (53 per cent) of Living Health users confirmed that they had used information they found to replace a visit to the doctor. Those reportedly using the Living Health service were just under twice as likely to use information found as an alternative to seeing the doctor. Older users and men, however, were less likely to use information in this way. NHS direct online, health books and magazines and the Internet were also significant as sources used as an alternative to seeing the doctor. Importantly, the younger the respondent the more likely they were to substitute information for a visit to the doctor. Older users, those aged over 55, were half as likely to use information found on Living Health as an alternative to a doctor's visit, as compared to younger people.

Where a person had an interest in general health, prescription drugs, healthy living and an interest in alternative health, then these people were more likely to use an information source as an alternative to seeing the doctor. This was strongly apparent in interview data as well as questionnaire returns ("I maybe know more about my health than the average person, and have a good idea about when I need to go to the doctors. I always do some research first now I have an extra resource."). Indeed, Living Health was considered by subscribers as an important, if not a more important, source of information compared to the NHS Phone line. This has to be regarded as significant in the decision to roll-out digital health to the nation.

Information on NHS Direct Digital also impacted on whether viewers used information found as a substitute for a visit to the doctor. Those using the service were just under one-and-a-half-times as likely to use information found in this way. This result was only significant at the 10 per cent level and further research is required to confirm the result. It was found, however, to be the least important information source compared to medical magazines and books, NHS Direct Telephone line and the Web. This suggested that the impact of this service was not as important as these other sources, probably because of its relatively limited content base.

Leads to an improvement in health

One-third of Living Health users said that the information found either helped or helped a lot in improving their condition. Nearly 62 per cent of Communicopia/NHS Direct Digital said that the information found either helped a little or helped a lot in improving their condition and 15 per cent said that it had helped a lot. In the case of Channel Health, three out of four women who used the enhanced text service, supporting the broadcast programmes, said that they found its information reassuring. Interviewees tended to say that the way they approached their pregnancy was healthier because of the programme contents: "My diet was better, I exercised, I felt better about what was happening. The programme helped me in all of these things."

Whether the service improved the user's condition or helped in understanding the condition appeared to depend on the extent to which people understood the nature of the Living Health service. This points to the importance of design, navigation and documentation; possibly, also, digital literacy training.

There was one surprise result. Whether the user found the system easy to view impacted on whether the person expressed a positive health outcome as a result of receiving digital health information, but the relationship was the inverse of what we might have expected. Those finding the system easy to view were not those who felt that there were significant or positive outcomes resulting from use. There is a sense here that the harder you have to work at it, the more appreciative you are of the benefits.

Use of the different digital products on offer

The relative popularity of each type of service (text and video based services and interactive and transactional) was assessed. Health commentators have championed the video for consumer health information (especially for those with literacy and language difficulties), and their take-up was of particular interest. Two pilots in particular presented a significant amount of content in video format. Channel Health produced a broadcast series of TV programmes on maternity issues and Communicopia provided a video-on-demand service comprising material on a variety of health topics.

Video Vs text

Of Channel Health's *Bush Babies* respondents, 70 per cent just viewed the video programme, 23 per cent reportedly viewed text and a video, while 7 per cent reportedly just viewed the text.

Both forms proved popular to Communicopia/NHS Direct Digital users. A total of 41 per cent of those who had used the NHS Direct Digital service claimed that they only used the text service and that they had not requested a video; 6 per cent said that they had only used the video service and 54 per cent said that they had used both text and video.

However, text proved to be the most popular; 60 per cent of NHS Direct Digital users said that they preferred the text service while 38 per cent said that they preferred the video service. This was reversed for men aged under 36. Focus group participants felt that some information presented in video form would have been better as text: it was suggested that information on medication, for instance, could have been better presented in tabular form.

Young men preferred videos; 63 per cent of men aged under 36 said that they preferred to watch videos rather than read text compared to 26 per cent of females in this age group who said so.

Users of NHS Direct were also asked to rate the importance of each service, the health video and text service. The average scores were similar, though there is suggestive/weak evidence that videos are easier to understand (3.4) compared to text (3.3) and that videos are more interesting (3.3) than the text service (3.1). Focus group interviewees tended to be of this opinion: "Of course, it's not just the information – if it is boring or dull, people won't take it in. Watching a video is at least a bit more interesting." Only 34 per cent of NHS Direct digital users, however, agreed with the statement that watching a health video was a big improvement on reading the text, one third disagreed and one third of users had no opinion. Men aged between 36 to 55, and men and women aged over 55 were more likely to say that watching a health video was an improvement. Of this group, 42 per cent agreed compared to 31 per cent of females in the 36 to 55 age group, only 20 per cent of those aged under 36 (male or female) agreed with this statement.

Transactional services

These services explored the potential of DiTV as a two-way medium where the user becomes an information sender as well as receiver. Such applications represent more advanced forms of interactivity and require a different mindset on the part of users who engage in a customised activity geared to addressing their specific problems rather than ones of a more general nature. These are genuinely new applications of TV. The applications tested in the pilots included visual interpersonal communication with an NHS nurse (InVision), online appointments booking with one's GP, and the maintenance of personal medical details online, in this instance personal immunisation records. In addition, one consortium (Channel Health) tested a small-scale e-mail support service for a specific group – pregnant women.

(1) *Living Health – InVision.* Despite the obvious warmth with which both

consumers and nurses received the service, relatively few people chose to use it. A total of 163 users from a potential audience of around 38,000 subscribing households in four months appears low. Four possible explanations suggest themselves: a small potential user population; the discouragement of casual users by the channel itself; the lack of publicity for these services; and, possibly, most importantly, the novelty and unfamiliarity of the services.

Nonetheless, the number of people (1,380) who activated pages leading to the "point of no return" connection button indicates much potential interest. Clearly, the issue is how you convert these "lookers" into users.

(2) *Living Health – GP surgery bookings service.* Use of this facility was plainly very low with just 30 people making an online appointment with their doctor over a period of six months. This was partly to do with the fact that there were only three surgeries in the pilot, and that the surgeries did not "sell" the service sufficiently to their patients. Given the amount of work that would have been involved to fully sign-up to the project and that it would only be available for a period of six months, this was probably unrealistic. An open-ended (time wise) roll-out might have produced different results.

(3) *Communicopia/NHS Direct Digital.* Views to the vaccination service accounted for 0.14 per cent of use; approximately 28 people used it. The service consisted of a reminder of when a jab was needed and users had to enter all relevant personal details. The take-up can be regarded as disappointing, but one has to question the value of this to a consumer when they know that it will only be in place for a short period.

Usability

Data were obtained from user reaction surveys, follow-up qualitative interviews and Serco usability lab research. DiTV is thought to be an easy-to-use health information medium. In practice, however, usability of the pilot services was found to vary with the individual user and the nature of the service being used.

Of Living Health respondents, 28 per cent said that it was "very easy" to find the information. Just under half found it either OK, hard or very hard to find information on the channel. Interviewees complained of the number of screens required to navigate ("there is hardly any information on a page – even the shortest of topics has six or seven pages to it").

Most participants in Serco's DKTV usability sessions were unclear about where to find the DKTV service within the HomeChoice menu on a broadband platform.

Some services proved almost trouble-free. The interactive service linked to the *Bush Babies* television series on Channel Health was universally described as being easy to use (although even here there was some concern about using arrow keys and sub-menus). Interviews with users of the e-mail service indicated that they experienced difficulties: "It wasn't Channel Health – it was the e-mail service that didn't work very well."

Digital visibility the key

In an analysis reviewing the menu position of the NHS Direct Digital on KIT (Nicholas *et al.*, 2002), it was found that the service became more difficult to access as its sign posting became ever more removed from the television service's opening menu. This led to the proportion of new visitors (as a percentage) of all users declining alarmingly. New users did not come through because of the increasing difficulty of finding the service. Those people who battled through to find the service, however, showed their tenacity by making more extensive use of the channel when they arrived.

In laboratory-based usability tests, Serco found instances of poor positioning leading to a lack of use – DKTV's "further details" button, for example, was missed by several viewers engrossed in the video content of the channel.

In sum, the number of clicks to obtain content is a critical feature with DiTV interactive services, and determines whether people find what they need.

Gender and employment

Women were less likely to find the Living Health system useful "all of the time" compared to men. Women were also more likely to say that the information offered was full of medical jargon.

Users living in higher unemployment areas were more likely to say the Living Health system was easy to navigate. Clearly, this finding requires further investigation before a full explanation can be offered.

Age differences

The elderly are clearly a source of concern when it comes to DiTV health services. On the one hand they offer the prospect of convenience and doing everything in the comfort of one's own home, but on the other they require a certain amount of dexterity and the elderly tend not to bring with them digital familiarity.

Not surprisingly then, the age of the respondent was found to impact on how easy the user found it to understand the Living Health service. Users over 66 were more likely to report that they ran into difficulties. Furthermore, older NHS Direct Digital users, particularly women aged over 55, found the service difficult to use.

Focus group sessions in which Communicopia/NHS Direct Digital videos were shown to elderly people revealed some anxiety about the march of information technology. Older participants felt that they would not have access to digital television in their lifetime and would be unsure of how to use it even if they did: "I can't even use a video (recorder) these days – it's got so complicated".

It helps if you are technologically literate or if you use a variety of health information sources

Unsurprisingly, users with a greater experience of technology were more likely to find the navigation and menu structure of Living Health easier. Users reporting that the general KIT DiTV service was easy to use were more likely to have used the NHS Direct Digital service provided by Communicopia.

Many interviewees who had used Living Health, or used the *Bush Babies* interactive service, or viewed the videos on NHS Direct Digital tended to use these in concert with a variety of other sources – Internet, books, etc. These information hungry respondents were used to various menu systems, indexes and different information configurations, and found it easy to adapt their skills to the medium of DiTV. ("I have always had an interest in health – now I can use the Internet and my television to supplement the books I have always used.")

Contrasts between views of medical professionals and lay consumers

The DiTV services were meant to be consumer friendly, obviously. Nevertheless, there is probably a tendency amongst health professionals to underestimate the consumer. Thus nurses who watched the NHS Direct Digital videos felt that the language and terminology used was often too difficult for the lay viewer. However, information professionals, general consumer interest groups and others all felt there was no problem in this area.

Authority, trust and branding

DiTV is a very new platform for health information and issues over whether the information could be trusted, and whether the NHS brand was visible and what it meant were of concern to the DoH. Clearly, matters are complicated by the fact that, with so many parties involved with the content, production and distribution of the digital services, ownership and responsibility are far from clear.

Of the users on Telewest's Birmingham cable platform, 60 said that they would trust the health information found on DiTV for most things; 38 per cent said they trusted the information and only 3 per cent of users said that they did not trust the information found. A substantial proportion (43 per cent) said they would not use the service should the NHS not be involved, and a large majority (81 per cent) thought the NHS should be involved with digital television, a finding echoed in interviews: "I just assumed the NHS was involved – it's a public service isn't it?"

For certain types of people the NHS brand really meant something. DiTV subscribers who had either used the Living Health service, which carried NHS branded health information, or had heard of the service were more likely to say that the NHS was a symbol of trust than DiTV subscribers who had not used the service. There were, however, digital users who did not buy into the NHS brand. DiTV users visiting the doctor less frequently and those less interested in health information were less likely to accept the NHS as a symbol of trust, were less likely to recognise the NHS symbol, and were less likely to say that the NHS branded information could be trusted. Younger respondents were also less likely to recognise the NHS as a symbol of trust compared to older respondents.

Communicopia/NHS Direct Digital users were asked to rate the trustworthiness of health information sources out of 5. Sources where the NHS appeared in the name performed well – NHS Direct phone and the NHS Direct service available on KIT scored respectively 3.9 and 3.8. This score placed these services below doctors and nurses (4.5 and 4.2) but above medical magazines and books (3.0).

Around half of Channel Health viewers who were surveyed for their reactions to its service were aware of NHS involvement and their reactions to this were largely positive. NHS branding was seen as offering more authority and credibility to the content ("It was nice to know that this was real information from a proper source. It was obvious the programme was helped by the NHS".) The more respondents had viewed the *Bush Babies* TV series, the greater their awareness of NHS involvement became.

Satisfaction

Satisfaction was a key DoH performance measure. They were not to be disappointed. A total of 45 per cent of Living Health viewers said that the service had been very useful, 48 per cent said that the service had been quite useful, while 7 per cent said that the service had not been useful. The main reason people gave for finding the service helpful was that they felt reassured by the information given – 50 per cent said so; 15 per cent of users said that the advice helped them deal with the condition themselves while 20 per cent said that the advice helped them to contact the right service. Interviewee respondents also indicated that the service was very useful, enabling them to, for example, avoid visiting the doctor, research a condition for a friend, and check information about medication. If DiTV was rolled out nationally there would appear to be significant gains.

The InVision service went down extremely well and comparisons between the telephone equivalent are instructive. Respondents rated the service either very satisfactory (76 per cent) or satisfactory (24 per cent) – 100 per cent satisfied in other words, versus 97.8 per cent (combined totals) for the NHS Direct telephone-only service. Additionally, 100 per cent of InVision customers polled said they would use the service again and/or recommend it to friends/family – versus 97.8 per cent for telephony.

Finally, 88 per cent of those who had used both InVision and the telephony service preferred InVision (the rest had no preference). These results suggest that the nurses were able to offer an equivalent service while having to engage the camera and operate the InVision system in addition to the normal CAS (clinical assessment system) software. Interviewee respondents all rated InVision above the telephone only NHS Direct – enthusing about the facility to see the nurse (rather than about how images could be sent to them): "It was so good to see the nurse – it was obvious she was interested. With the telephone service you cannot tell how much she is paying attention."

The 35 respondents who claimed to have viewed or used DKTV were asked to rate their overall satisfaction with DKTV along a four-point scale from very satisfied to not satisfied at all. Two respondents were very satisfied, 21 were quite satisfied, seven were not very satisfied and one was not at all satisfied. The remainder did not know (or care). The average satisfaction score indicated that these respondents were only "quite satisfied" with the service. When asked how often they thought that they or their family would use DKTV in the future, most of these respondents (20) thought they would use it about the same as now, with nine saying they would use DKTV more often and six saying less often.

Most people who used the Channel Health/ *Bush Babies* service thought the service quite useful – 60 per cent said so. Those in social class D/E were less likely to say that the information would be useful for them: 17 per cent of this group said the information would be useful for them, compared to 40 per cent from other groups. Furthermore, those living with a partner said that the videos were useful to them: 56 per cent said this compared to 37 per cent of married and 8 per cent of single users. For those users who were pregnant, 83 per cent said the information was useful to them compared to 29 per cent who were not pregnant.

People who used Communicopia/NHS Direct Digital generally found what they were looking for. A total of 15 per cent of NHS Direct viewers agreed and 69 per cent disagreed with the statement that in general users could not find what they are looking for on the service. Of the users, 81 per cent said that if they needed health advice they would consult health information on KIT. There is suggestive evidence that carers (informal and formal) were less likely to say that they would consult the service compared to non-carers. This needs further research, particularly as it is contrary to what one would expect.

Comparisons with other digital platforms

In parallel with the DiTV study, City researchers were also investigating other digital platforms providing heath information and advice[2]. On the basis of this work (Nicholas *et al.*, 2001; Williams *et al.*, 2001, Huntington *et al.*, 2002), the following comparisons have been made:

- Compared to the Web and kiosks, DiTV attracted a greater percentage of its users at weekends. This is no surprise, as the DiTV service is the only "home only" service. Many people may only have access to the Web at work or in a public place, and the kiosks are, of course, sited away from the home.
- Compared to the Web, DiTV attracted more repeat visits. This could be ascribed to easier access, but it could also be a function of more limited choice – it is possible that Web users revisited for health purposes, but to another competing health site. During the pilot period, there was no competing health information service on any of the specific DiTV platforms being investigated. Hence, Telewest subscribers, for example, had no option but to return to the Living Health channel.
- DiTV users took a third longer to view a screen than kiosk users, possibly reflecting the fact that they were using the service in the comfort of their own homes.
- DiTV users viewed three times the number of pages that kiosk users did. This is because DiTV users have the time to penetrate the system. Furthermore, users cannot scroll on DiTV and will inevitably view more pages. It is not uncommon to find health information, but not menus, spread over up to seven to eight pages.
- DiTV users spent the most time viewing – approximately five to six minutes during a session compared to three to four minutes for Web users and about one minute for kiosk users. This is thought to be because DiTV users had more time to view pages and, in the main, were forced to read the content, as they did not have a printer (some KIT users had printers attached to their TV sets).
- Compared to kiosk users, DiTV users were more willing to interrogate the system beyond the menu screens. Kiosk users were thought to be rushed for time and may have been unwilling to invest the time necessary to interrogate what may be a new system for them. As previously mentioned, DiTV users view the service in their home, at a time convenient to them, and on a system that they have used before and hence may be far more willing to interrogate the system.

This all suggests that, because users are viewing a system in their own home and one with which they are familiar, they will interrogate more topics, view more pages, will have longer search sessions etc. The log metrics point to a greater use of DiTV. To date, the data are lacking to give a comprehensive analysis of the reasons why such differences in use of online health on different platforms occur. However, it seems highly likely that differential ease of use of the technologies and information systems is one factor. Clearly, with kiosks, users may not have seen the system before and they might be at a loss to use the service effectively. This is not so true of the DiTV service, where users have some previous relevant experience in the use of the medium. In fact, our research generally points to greater use in households where the TV plays a central role – i.e. where households have a previous experience of TV viewing. If you like, the technology learning curve is lower. In relation to the use of television interactively, however, industry research has indicated that significant numbers of subscribers to mainstream television services offering interactive capabilities do not use the interactive elements of these services. In any case, interactivity on mainstream broadcast television tends to occur at an elementary level (e.g. choosing between different camera angles at a sports contest or selecting enhanced news footage behind a regular news broadcast). The more complex level of interactivity represented by the digital health pilots requires a different degree of involvement on the part of viewers.

Overall conclusions

DiTV appears to have the potential to attract a large audience. This audience comprises an extensive number of occasional users rather than a large one-off audience, but that probably reflects the nature of the health information need. Reach figures indicated that significant numbers of people who have access to these online services use them from time to time. Encouraging take-up figures suggest a viable future, and evidence shows that when people use the services once, they are likely to do so again.

Health is a popular topic likely to attract viewers to watch regular television programmes, but it can also encourage viewers to use television more interactively. They are prepared to search for information that is of use to them or their families. It should be noted, however, that they might not be prepared, as yet, to search as much for health information as Internet users. Hence, interactive TV sites must be easy to use and enable users quickly and efficiently to reach the information they seek, and the content has to be worth seeking.

What is also encouraging is that the digital health services appear to reach groups that the DoH have targeted because they have proved that can be difficult to access via other methods. Furthermore, DiTV has achieved a different demographic profile of users from that of other platforms, which shows that a suite of online technologies is needed rather than all the investment going to a single, supposedly convergent technology.

As well as low-income groups, DiTV reaches older users, especially older male users. There is also evidence that it can encourage younger male users who are noted for not checking up on their health. It can also be effective at reaching specific groups with specific conditions, e.g. pregnant women.

Low take-up of Living Health's InVision and online GP bookings service suggests unfamiliarity and an uncertainty with transactional services. The level of use recorded for Communicopia/NHS Digital Direct's immunisation records service reinforces this point. This may indicate a need both for user friendly interface designs and possibly also training designed to promote interactive TV literacy. Alternatively, it may also indicate that some applications, such as an appointments booking service, where a degree of negotiation and flexibility are required among patients and health service providers, are more difficult to transfer into the online environment.

People appear to be selective in their use of different media. Pages and topics accessed via DiTV are different from those accessed on the Internet or a publicly located touch-screen kiosk, due to considerations of privacy, time availability and the amount of choice offered. With regard to format, video appears to be less consulted than text services. However, it might be the case that, while the absolute number of videos consulted is less than the absolute number of text pages examined, users spend more time with videos than text. So overall, distribution of time to these formats might work out about the same in the end.

Again, there is the issue of "application effectiveness". This means finding the most appropriate, effective and acceptable format for a particular type of application. Focus group interviewees suggested that text was more appropriate for certain kinds of information (e.g. basic facts), and more easily consulted than having to run through a video to find a particular item. Video has a different psychological functionality for users. Text is factual, while videos can succour emotional needs too. This point is important both in respect of the construction of online libraries of health information, and also in relation to "live" transactional links. There is mounting research on the use of computer-mediated communications – outside the health sphere – that has shown that the rules of interpersonal communication online may vary from those that prevail in face to face communication. This research may have important implications for the design of user interfaces and decisions about the types of formats that could most effectively be applied to facilitate online health-related communications.

Even where there was no facility (i.e. printer) to copy information, time spent perusing pages has to be regarded as minimal. Further work is needed to examine how information is assimilated and used by DiTV subscribers. For instance, users may feel better informed by video, but absorb less factual information than they would from text.

The health topics viewed, whilst differing across platforms and formats, nevertheless appear to suggest the services were used very much for consultation/reference with regard to specific conditions, rather than for general browsing or recreational use, which one might have expected. Users of Living Health acknowledged that this was a primary reason for using the service. Digital health services provide support for a number of specific functional needs on the part of NHS patients and members of the general public. Future research should attempt systematically to map out these needs and determine the delivery platforms, formats and content that will effectively satisfy them.

The information retrieved appears, for all services, to have made some impact on dealings with doctors, and there is some evidence to suggest that people are using it as an alternative to making GP appointments. Our data provide support for the belief that digital health services could help the NHS in terms of reduced demand or economies in relation to certain offline services. Furthermore, and in a broader sense, if online health information can cultivate greater self-care and adoption of preventative "medicine", further economies may be felt in an over-stretched NHS.

Self-report data indicate that having information does help one manage medical problems, in a conditional way. The degree to which this occurs also depends on the type of user. For example, Living Health users stated that the type of service it provided could help them in relation to consultations with a doctor. There was further evidence that it could serve as an alternative to information from a doctor – though non-users indicated that they preferred getting medical information straight from the doctor, whether spoken or in writing, than any other information source.

For the pregnant women of Channel Health, the TV/interactive service was seen mostly as a supplement to seeing health professionals. With their particular condition, it was still essential to have physical diagnoses and checks with doctors and nurses, etc. There was some indication that a service such as Channel Health's interactive elements could be used in relation to reminders of appointments – as endorsed by health professionals. However, as the Living Health experience demonstrated, there is a relatively slow take-up for an actual online appointments booking service.

Summing up, the DiTV online health service pilot delivered mixed results across a variety of services. Early audience uptake of these services indicated that a market for digital health does exist. The public are likely to welcome an online health information service sourced by a trusted brand. Health-related programmes, especially on themes of special interest to niche audience groups, will attract viewers, as will health-related videos on demand, provided they are of good production quality. Enhanced information services that lie behind familiar broadcasting will also be accessed, provided the user interface is not overly complex. More sophisticated interactive services that invite two-way flows of information between the user at home and health service provider are likely to take longer to become established. In popular parlance, television is a "lean back" medium that has not traditionally invited its users to actively engage with it. In contrast, the personal computer is a "lean forward" medium that has always encouraged a high degree of interactivity on the part of its users.

Different technologies are associated with distinct psychological dispositions on the part of their users. This distinction must not be forgotten when considering television's potential as an interactive technology. Over time, these two technologies may become largely indistinguishable, as will the psychology of users in each case. Until then, any application of television as an interactive health information medium must be mindful of these distinctions and take them into full consideration when determining the nature and form of digital health services on the box.

Notes

1. The Telewest digital household figures for Birmingham were: 1st June 2001: 38,149; 1 December 2001: 51,963. This provides an average household figure across the pilot of 45,056 homes.
2. The Web, the kiosk, digital TV and the changing and evolving face of consumer health information prevision: a national impact study, 2000-2003. DoH funded.

References

City University (2002), *First Steps Towards Providing the Nation with Health Care Advice and Information via their Television Sets. An Evaluation of Pilot Projects Exploring the Health Applicants of Digital Interactive Television*, City University, London.

Huntington, P., Williams, P. and Nicholas, D. (2002), "Age and gender user differences of a touch-screen kiosk: a case study of kiosk transaction log files", *Journal of Informatics in Primary Care*, Vol. 10 No. 1, pp. 3-9.

Nicholas, D., Huntington, P., Williams, P. and Gunter, B. (2001), "Delivering consumer health information digitally: platform comparisons", *International Online Conference, Olympia December 2001*, Learned Information Limited, Oxford, pp. 145-53.

Nicholas, D., Huntington, P., Williams, P. and Gunter, B. (2002), "Digital visibility: menu prominence and its impact on use of the NHS Direct information channel on Kingston Interactive Television", *Aslib Proceedings*, Vol. 54 No. 4, pp. 213-21.

Williams, P., Nicholas, D. and Huntington, P. (2001), "Walk in to (digital) health information: the introduction of a digital health information system at an NHS Walk-in Centre", *CD & Online Notes*, Vol. 14 No. 2, pp. 4-7.

Library portal solutions

Andrew Cox and
Robin Yeates

The authors

Andrew Cox is based at the Department of Information Science, Loughborough University, UK.
E-mail: a.m.cox@lboro.ac.uk
Robin Yeates is based at the Department of Information Science, City University, London, UK.
E-mail: yeatesr@soi.city.ac.uk

Keywords

Libraries, Management systems, Internet, Effectiveness

Abstract

This article reviews a significant range of new products developed by library management system (LMS) suppliers, which will be referred to for convenience as library portal solutions (LPS) and whose purpose is to manage access to e-content in an integrated way with books, journals and other library stock. The article reviews current understanding of user requirements and then describes the state of the current market place, based on a survey of suppliers conducted in May and June 2002, as well as on supplier Web sites and live demonstrations. The article concludes by summarising evaluation criteria for choosing a system, and makes some tentative predictions about the development of the market place in the next five years. The perspective is primarily that of a UK academic library, but the products are certainly of interest to libraries in many sectors in every country.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 3 · 2003 · pp. 155-165
© MCB UP Limited
ISSN 0001-253X
DOI 10.1108/00012530310472642

The problem: integrated access and management

To date, full text electronic information sources, e-journals but also electronic books and locally digitised content and links to free resources have tended to be managed in UK academic libraries separately from "traditional media" such as books, journals and other stock. This followed practice with bibliographic databases, which were catalogued only in the LMS at the database level. When online public access catalogues (OPACs) were primarily searched through text based interfaces the value of cataloguing individual electronic journal titles was limited, as the user could not satisfactorily click through to the full text. But this factor has declined as increasingly all access to the catalogue is through a webpac. Another obstacle to cataloguing electronic collections in the library catalogue was the changeability of URLs, particularly as library systems did not have global replace features to allow changes to base URLs to be made easily. In some publisher systems URLs for individual e-journal titles could not be specified. Gradually, though, publishers and aggregators have recognised the value of specifying persistent URLs, down to the article level, and of supplying libraries with ready-made MARC cataloguing data for individual e-journal titles. Cataloguing e-content was also seen as diminishing the quality of the library catalogue, which traditionally was of tangible objects the library owned, rather than of objects for which a right of access was licensed for a distinct period.

So for a mixture of reasons users have been directed to search information collections of e-content outside the OPAC. But as academic libraries have bought more and more electronic information sources and larger and larger collections of e-journals, the desire to offer users the ability to find electronic titles, or check whether a title is available electronically as well as in print, has encouraged libraries to seek to manage access to e-content in a more integrated way with other library holdings. The complexities of searching multiple sources including the library catalogue, multiple e-journal collection interfaces, and multiple

Received 25 August 2002
Revised 10 September 2002
Accepted 10 October 2002

bibliographic databases to find references and locate the full text, reflected in inefficient use of document delivery and ILL, has come to be seen as a critical problem for user education. It is seen to lie behind students' neglect of quality resources and the preference for simple google searches, however inadequate this is in terms of quality (Armstrong *et al.*, 2001). In short, libraries are searching for tools to help users discover the appropriate resources to search, to conduct the search and to guide them to locating the full text, be it online or in a library. Equally, the management facilities, such as budgeting and reporting in the LMS for books and journals, could usefully be applied to electronic content, ideally in an integrated way.

Library controlled solutions

A number of solutions have been developed, on a rather ad hoc basis, to manage e-content for users. They have focussed primarily on e-journals. The simplest approach has been that many libraries have created static Web pages, not simply listing major collections that are available to users, but all the individual electronic titles (often running to hundreds) they have access to. This listing might show years available, a link to help or authenticate information. The problems with this approach are first that the user has to search the listing separately from the OPAC and other sources. Nor does it, second, offer the user the access points they want, e.g. searches by subject or at the article level. Third, in management terms major changes to the list are very time consuming to make. A practical solution to the last problem has been sought in creating locally designed Web enabled databases of e-journal titles and other electronic content. This makes it practical to quickly update journal level links and show subject clusters, not just list e-journals in title order. To a certain extent it is a future proofed solution in that descriptive data held in the database could be exported to another system (Gardener and Pinfield, 2001). The two main limitations with this approach are that first there is no linking of titles in the OPAC and electronic versions so that users continue to have two places to search for relevant sources. Second, and more fundamentally, searching is at the journal title level not at the article level. A solution to this problem is offered by some third party services such as TDNet and Serials Solutions (for URL see references). TDNet is a third party service for managing a library's e-journals and offering TOC and article level searching. The library supplies TDNet with a listing of e-journal titles held and their print titles, and from this TDNet constructs a searchable database of all e-titles customised for the individual library, with links to holdings statements in the OPAC where print versions are held. Because TDNet is managing the same titles for many libraries it is practical for them to add article level detail; and based on this TOC alerts. TDNet supplies a list of electronic holdings suitable for importing into the local library system. There are perhaps small weaknesses, for example, in the level of statistics; but the primary remaining problem with this approach is that it requires users to search separately for e-journals outside the library catalogue.

New solutions from LMS vendors

During 2001 and 2002 a range of new products have been launched by LMS suppliers. Three main areas of functionality can be identified in these systems, with different systems stressing one aspect more than another (although the underlying technology may be similar):

1. (1) Managing the digitisation process, storage of digital content and managing access to digitised material, including images.
2. (2) Bibliographic enrichment, that is adding links to or incorporating book tables of content, reviews, dust cover images and other enhanced information into traditional descriptive records about library holdings.
3. (3) Managing and integrating information from multiple suppliers with multiple hosts/metadata formats in use. Supporting resource discovery and searching, and document delivery.

It is this third function that meets the need to manage e-content alongside books and journals, and it is with this function the main body of this article is concerned.

Requirements

An awareness of the requirements of an academic library from such systems has been developed over the last five years, most notably in eLib's Hybrid library projects and EC Telematics for Libraries projects (see especially HeadLine, 2001; Russell, 1999). Indeed two of the systems trace their roots directly to that work: OCLC/Pica's iPort is based on the system designed in the Decomate project, and ZPortal is based partly on software designed in the Agora project (Russell, 1999). Interestingly, systems originating in the USA to date appear to be almost always created by a single vendor working with their customers rather than by wider collaborative consortia.

The requirements could be summarised as follows:

Tools for resource discovery
Tools are needed for the user to navigate through available resources, e.g. by searching descriptions of services or browsing resources pre-clustered by subject.

Cross searching
The ability to cross search different resources is required, that is first across metadata held in different repositories, second, across content described by different metadata standards (including across curatorial domains), third, using different search protocols and fourth, finding different data types (e.g. images and full text as well as bibliographic information). Results from such searches could create conceptual problems in understanding, for the user, if not handled carefully. Cross searching just anything does not make much sense, and puts greater stress on the users' ability to evaluate the information thus found, than searches within a single well known source. It might, however, be satisfactory for simple searches, by "naïve users". After all, this sort of bucket search is essentially what search engines do. More meaningful results will be found if datasets are pre-clustered by subject.

The systems now on sale rely primarily on Z39.50 to search multiple data sources. There are known problems with exchange of data through Z, such as poor maintenance of Z servers, variable quality of basic data except in the most core data fields. Cross searching will not work well if the data in the target system are poor or inconsistent. Serial holdings are catalogued differently in different suppliers' systems. Searches are often slow. Some of these problems will begin to vanish as cross searching becomes more commonplace and errors and weaknesses in data are exposed and recognised to be important. More fundamentally, Z39.50 may itself have a limited future since it is often perceived to be over complex and has not been universally adopted. A promising alternative is Web services technology (see Gardner, 2001; Powell and Lyon, 2002). The typical model used in LPS is of distributed searching, that is, a search query is sent on the fly to various data sources, and the results returned for processing into a results report for the user by the home system. OAI partly challenges this and proposes that it is more efficient to harvest metadata to local systems. Mixtures of these approaches are also feasible.

A common interface
Users need a common, familiar search screen that could be used to search any dataset, as well as the facility to switch to the native search interface where appropriate. While searching multiple databases from one screen has its problems, the benefit of having a common interface that is familiar to the user and can work fairly well with many systems is attractive. Again this is a feature offered by LPS. Users can be trained to use the one system, and then move comfortably between datasets. It remains true, however, that publisher interfaces have powerful search functionality, especially where they offer an advanced taxonomic structure with which users are familiar and have been trained to habitually use. It is unlikely that the common interface will be as good as the database's native search interface in the near future, especially regarding the taxonomic features. So it is essential that the user still has easy access to this interface when required.

Linking and support through to document delivery
Cross-linking between resources is desirable as well as cross searching, for example, so that one can find the full text of an article discovered through online citations. Resolution should find the "appropriate copy": that is, the best of all document delivery options (for example, go to library, full text online, possibly in multiple places, ILL, document delivery) for that particular user, as determined by rules set by the library.

Authentication/authorisation
Ideally the system should interact with other local authentication systems so that the user

only has to log in once somewhere on the local system for authorisation credentials for other systems to be activated. This will achieve a "single sign on". (Pinfield *et al.*, 1999). Having to remember multiple passwords is a common complaint cited as a reason for not using library approved resources, as opposed to simple google searches. The full functionality of the system should be available off campus.

Profiling of users

Profiling of users enables users to save searches, rerun searches, register to be alerted of new TOCs and to customise interfaces or prioritised resources.

Interoperation

A fundamental need is that the system should be capable of interoperating with other systems, based on open standards. Just as the library portal serves to integrate content for the user from multiple sources, so the library portal may itself be composed of functions provided by services from a number of systems: resolvers, authentication brokers, agents. The solution to creating a Web of interoperating systems (which appear as one to the user) is standards based "Middleware". Rather than creating bespoke links between one system and another, it will be far more efficient to base all the systems on standards and so be able to design generic links (Paschoud, 2002). Services can be integrated by libraries themselves, but the nature of the technology invites arrangements between system suppliers. Thus there have been many deals between system vendors and suppliers of enhancements to bibliographic data. At its launch in mid 2002 Talis offered TDNet as part of its Information Environment.

Just as the library portal pulls together multiple sources and services, it should also be able to offer a service to other systems. Although the library would like users to know they are using library supplied services when they do so, and to come through the library's own portal to the world of information, in reality there are many competing "gateways to everything". The library will commonly not be the most used starting point for a literature search. It is far more likely that a student will see "home" as an institutional portal or a virtual learning environment or a departmental Web site. This means that it will be most effective for libraries to offer up the library portal to supply a service to other gateways. Thus a library managed collection of links to subject resources could be inserted within a departmental Web site, or searched within a VLE. Web services technology increasingly makes this possible. There are some problems with achieving this, especially where the library is first to develop its system, since it must be future proofed against options chosen by the institution later. The technology used may be an issue, but so may be subject terminology. Library resources must be accessible by subject, but the subject terms in use and the basic divisions must match institutional understanding of how study subjects are divided up. An institution may produce this after the library has settled on its own.

Statistics and management information

Statistics about users and usage should be at the heart of improved management of electronic information. Currently, libraries have huge problems measuring the relative performance and value of services, because each publisher offers usage data in multiple formats there are no agreed definitions of terms for different fields. Often usage data are offered statically on the Web, without the ability to export it to spreadsheets for processing and cross analysis. A single library may well have 50 or 60 usage reports, each differently formatted. Part of the promise of library portal systems is that they will integrate and unify this management information.

Look and feel

The look and feel of a search interface is critical to its acceptability, especially with increasingly stringent usability and accessibility requirements being applied in the academic sector. The concept of skins should allow suppliers to deliver improved interfaces over time and information professionals to customise local implementations where necessary. XSL stylesheets and transformations are used to allow separate development of content, workflow and presentation that can meet a variety of end-user needs, including those with desktop terminals, portable devices such as PDAs and laptops. This avoids the need to re-key content, and allows libraries to give more responsibility to users to keep their own personal information up to date.

Communication/real time support
ARL requirements include provision for real time support tools, recognising that scaleable support to distributed users is required. Also on the Web, portals are often used to help develop "virtual communities" or loose networks between people with similar interests. Academic institutions have often been poor at this sort of knowledge management, connecting people with similar interests who happen to work in different departments. The LPS could be the focus of creating such communities, be this through connecting people who have similar search profiles, collaborative surfing or even through controlled public exposure of reference enquires (Robertson and Reese, 1999).

Core technology
In theory, at least, if based on programming languages such as Java, such a system should work on any platform. This would be advantageous as most institutions have a preferred operating system or flavour of unix.

Some characteristics of the market place in 2002

During 2001 and 2002 almost all the larger LMS vendors brought out a product that sought to satisfy the requirements described above. The following observations of the character of the market place are based on a survey of the suppliers conducted in May and June 2002, as well as direct discussions with the suppliers and a reading of product literature and product Web sites and "canned" demos (Cox and Yeates, 2002). The authors acknowledge the limitations of this as an exercise, and offer the following discussion to stimulate open debate rather than to guide system choice, which must necessarily be a more rigorous process based on detailed evaluation of current systems and systematic trials of demonstration systems. Naturally, it is no intention of the authors to either endorse any product or do other than fairly represent each supplier's market position. A list of the suppliers surveyed is to be found in Table I.

Market leaders

In mid 2002 Ex Libris and Fretwell-Downing Informatics (FDi) could probably have been considered to be market leaders, by virtue of recent major sales in the USA, Fretwell-Downing to some ARL member institutions, as part of the Scholars Portal project (Fretwell-Downing, 2002), and Ex Libris through sales of SFX (not Metalib as such) to the California State Library system (Ex Libris, 2002). Endeavor also has a highly developed product, ENCompass, and Innovative's MAP has been in place for a number of years, a fact that is masked by it only recently being "productised". These four suppliers have the largest claimed sales to date, though some of the sold systems may not yet have been implemented. Metalib is claimed to have been sold to 40 organisations worldwide, chiefly in the USA, with SFX by itself having been sold to 190 institutions, in 17 countries. FDI claims 14 sales for Zportal, counting ARL libraries as individual organisations. Encompass has 24 sales, mostly in the United States and MAP 26. Just a handful of all these sales have been in the UK. The vast majority of ENCompass and Zportal customers are US academic libraries. Metalib's customers are noticeably more diverse with a pharmaceutical company, national library and sales in Europe, Australia and South Africa, but also to Harvard and MIT. Other suppliers have much smaller customer bases to date, for example, PICA has sold to only five universities (all in continental Europe). The original requirements for Metalib were set out by KOBV, the Cooperative Library Network for Berlin and Brandenburg, as far back as 1997. Most of the other products seem to have much shorter life histories. At the same time, while customers may be reluctant to buy a raw product, today's market leaders can be quickly overtaken in a rapidly changing technical environment, Talis and ESP's X products speak much more boldly the language of J2EE and Web services, while Zportal, say, is closely tied to the language of Z39.50, as the name suggests.

Interoperability

Nearly all the products are marketed as being capable of being used as standalone from any particular LMS, and capable of interacting with any LMS. Metalib has been implemented with other LMS including Innovative and PICA systems, ENCompass with SIRSI and innovative sites, Zportal with a large number of other systems. In other cases the claims to work with other LMS may

Table I Supplier details

Product name (supplier)	Type	Web Address
Chameleon iPortal (VTLS)	Supplier:	http://www.vtls.com/index.shtml
	Product:	http://www.vtls.com/Products/gateway/
	Demo:	http://hermes.vtls.com:8000/cgi-bin/gw_40_2/chameleon
DigitaLink/iPac (epixtech)	Supplier:	http://www.epixtech.com
	Product:	http://www.epixtech.com/products/ipac.asp
	Demo:	http://www.epixtech.com/streaming/ipac/demo.asp
ENCompass (Endeavor)	Supplier:	http://www.endinfosys.com/
	Product:	http://encompass.endinfosys.com/
	Demo:	
iLink (Sirsi)	Supplier:	http://www.sirsi.com/
	Product:	http://www.infobistro.com/
	Demo:	http://www.sirsi.com/Sirsiproducts/elibdemos.html
iPort (OCLC/PICA)	Supplier:	http://oclcpica.org/?id=2&ln=uk
	Product:	http://www.pica.nl/en/news/iport.shtml
	Demo:	http://192.87.104.20:5110/iport?language=eng
MAP (Innovative Interfaces)	Supplier:	http://www.iii.com/
	Product:	http://www.iii.com/html/products/p_map.shtml
	Demo:	
Metalib (Ex Libris)	Supplier:	http://www.aleph.co.il/
	Product:	http://www.aleph.co.il/metalib/index.html, http://www.sfxit.com/
	Demo:	
TalisPrism (Talis)	Supplier:	http://www.talis.com/
	Product:	http://www.talis.com/pressrele/talisprism.htm
	Demo:	
Xdirectory (Esprit Soutron Partnership)	Supplier:	http://www.espritsoutronpartnership.com/
	Product:	http://www.espritsoutronpartnership.com/products/xdirectory/index.asp
	Demo:	
ZPORTAL (Fretwell-Downing Informatics)	Supplier:	http://www.fdgroup.com/fdi/
	Product:	http://www.fdgroup.com/fdi/zportal/about.html
	Demo:	

rest only on compliance with open standards rather than proven implementations. To be fair it is the closed character of most LMS that is the limiting factor. The suspicion with late entrants could be that the systems may have been launched to protect sales of the core LMS; whereas it is clearer that early entrants hope for the possibility of creating a new market place. This applies particularly to Ex Libris, at least for SFX, because of its influence on the open URL standard.

Development paths

The product development path and partners, indeed the commercial model and national base of the LMS vendor may themselves colour customer perception of the product. PICA/OCLC have an impeccable background of service to library values and OCLC charitable status, and iPort is based on work in Decomate (an EC funded project). FDi's products were developed in eLib and European projects, most notably Agora. Talis is owned by a consortium of UK public and academic libraries. These suppliers can speak the language of partnership with some conviction. Certainly Fretwell-Downing marketing is fluent in the language of eLib using terms that will be familiar to UK academic librarians. Talis rather cheekily talks of the Talis Information Environment, echoing JISC's use of the phrase information environment to express its vision of an information architecture, which again will be familiar to university librarians (see Appendix). These factors may have an importance beyond creating a fluency in marketing language. US based suppliers may suffer from the fear in customers' minds that systems will not have so clear a fit into UK agendas, such as the hybrid library research and the requirements of the JISC Information Environment and recognition of the importance of Athens. Support of Athens is surprisingly limited in the surveyed products, even given that in the next few years Athens is due to be replaced by Sparta. Within both Metalib and ENCompass Athens compliance was reported only to be a planned future development (though SFX is Athens compliant). Zportal and MAP claim to be compliant. It remains true, however, that the core requirements set out by ARL, for example, do not notably diverge from those set out in the hybrid library literature (ARL, 2002, Appendix A). It is possible, therefore, that the core agenda for libraries internationally is much the same. Indeed, requirements across library sectors may not differ greatly, so that NHS knowledge services, public libraries in the People's Network as well as national libraries and major business libraries will all require much the same systems in the next five to ten years.

Innovation

The survey seemed to show that the suppliers were being quite slow to take on new protocols. For example, the OAI-MPH was not supported by most of the systems, though the most exciting current developments in resource sharing, such as the JISC FAIR programme of projects seem to rely on this standard (JISC, 2002). This may reflect both slowness on the suppliers' side to develop the products, but perhaps more realistically also a lack of demand from the library side, given that few have as yet bought LPS. Suppliers may be more responsive once a critical mass of customers emerges.

Market strategies

How the products are packaged varies. Zportal can be purchased standalone or integrated with the Olib LMS and has a number of extra "plug-ins" that are bought separately (e.g. Z2Web for searching non Z compliant Web sites, Zharvest to search Web metadata, Z'Mbol for any unstructured data). In contrast, Encompass is offered in three versions: the full version and two entry level products, ENCompass for resource access (primarily offering cross searching functionality), and ENCompass for digital collections (focussed on digitisation). LinkfinderPlus, the open linking solution, can be bought as part of the three Encompass products or standalone. Metalib includes SFX as a component that can also be bought separately. It also has a digital collections management tool, called Digitool. MAP started as part of the core Millennium LMS, but has since been productised. It consists of three elements: MetaFind (a universal search interface), WebBridge (for context sensitive resource linking), and Web Access Management (for user authentication). Whereas most of the systems described here are add-ons, Talis PRISM is offered in the core library product, at no extra charge.

Ex Libris supplies with Metalib/SFX a KnowledgeBase used to manage linking; as does Endeavor with LinkFinder*Plus*. In the Ex Libris model the supplier continues to maintain and update the KnowledgeBase for client libraries. This may signal a shift in the business model for the LMS supplier and potentially of the relationship with the client. Similarly, there is much more configuration work with interoperable systems than with a traditional LMS, and this may change the business model for suppliers, with much more stress on supplying or organising the cooperative creation of content and customising connections between different systems. In other cases this work could be undertaken by libraries themselves.

The ESP offering is more modular than the other systems, and rather different from the other products discussed here, the primary marketing strategy seems to be sell each or a number of tools to solve specific problems, e.g. offering access to digitised examination papers, or to e-journal links, or to distributed input into an information catalogue as a community information system (Xdirectory), or authentication (I*Access). As a toolkit it would require more input to create the functionality available out of the box from Metalib, say, and some of the others. In fact any non-library CMS or portal toolkit could be adapted to provide the same functionality as such library portal products, but actually would involve a lot of work to configure. In the UK, Roberts reports on opting not to use the most likely ready made library portal system for his metadata integration project, though the scope of the project is narrowly focussed on cross searching of locally digitised resources (Roberts, 2002).

If all this smacks a little of marketing by confusion, it may reflect more innocently the diverse development paths of the products and the suppliers' struggle to present them in an understandable and familiar way to potential customers. It also reflects fundamental differences in the products. SIRSI's iBistro and iLink seem to be primarily about enrichment of standard bibliographic records with cover images, TOCs etc. Metalib is built round open linking and SFX, with a huge database of resources defined at a fine granular level.

Selling points

But it remains a confusing marketplace, where it is difficult to compare like with like, to know which modules will be actually required to achieve what is wanted and how far modules from different systems could really interact. Our survey attempted to shed a little light into this confusion by asking suppliers to identify what they thought their selling points over their rivals were. If nothing else, this suggests where the stress in their marketing is taking place. The following paragraphs represent some of their responses.

In describing Zportal FDi stressed support from resource discovery through to final delivery of the text of a document. Its work on complex systems in Australia for ILL puts it in a strong place to offer document delivery services. But the dominance of the British Library as an ILL supplier to UK academic libraries may weaken this appeal here. In other systems ILL seems to be underdeveloped, possibly because a decision was made to incorporate the functionality in the supplier's core LMS instead. Zportal also stresses that its standard interface was designed by an experienced Web designer, whereas other suppliers stress openness to local customisation. Given the complexity of usable Web design and interface design, Fretwell-Downing's identification of this as a selling point may be well founded.

Ex Libris stresses the maturity of Metalib, and not just its compliance with standards but also the influential nature of SFX and the company's participation in standard evolution. The size of the standard SFX Knowledgebase (160,000 ISSNs and 40,200 e-books) is also a strength. It also stresses the personalisation tools.

Endeavor stressed multi-protocol search access. It claimed that Encompass was "the only product to provide access via Z39.50, HTTP, and XML gateways". Flexibility in interface design using XSL was also stressed. MAP rather similarly stresses cross searching and other linking capabilities and strength of ability of the library to make local configuration.

Linking to learning environments

For universities, integration of the digital library with learning environments is increasingly seen as a critical issue. ENCompass has stolen a march on its competitors with a demonstration at this year's American Library Association summer meeting (and at the UK LIS-Show) of an ENCompass search screen embedded in the learning environment Blackboard (Blackboard, 2002). FDi was until recently part of the same company as FDE, which was itself selling a learning environment, especially popular in the FE sector. Development projects like EASEL were exploring digital library/VLE integration (see references for URL).

Skills required of librarians

The survey revealed mixed views on what new skills librarians might need to manage such services. In some cases the suppliers claimed that no new knowledge was needed. Others thought a working knowledge of XML/XSL would be useful (presumably to design search result screens). In at least one case, significant knowledge of scripting languages, at least to support an installation, was recommended.

Conclusions

Each library will evaluate the new products in relation to the success of existing solutions such as those described above and the extent of the perceived benefits of integrating content for users or enhanced management offered by Library Portal Solutions, but common evaluation criteria are likely to be:

- Which LMS is in use locally? Many of the products are offered as standalone solutions, but the risk of purchasing a LPS from a supplier other than the one that provides the local LMS is likely to be seen as high.
- Cost, taking into account optional extras and configuration by the supplier.
- Licence terms. The survey revealed a great variety of licence models, including terms based on the number of staff users, size of institution, size of library, number of departments using the system.

- Basic technology used. Some of the systems surveyed were available only on a particular flavour of unix or using a particular proprietary database. It will influence selection if these do not happen to be the ones preferred by the institution.
- Supplier credibility, that is the usual measures of a supplier's long term financial viability, such as return on capital employed or the Acid test.
- Search, metadata and content type protocols currently supported, relative to immediate local requirements.
- Innovation. Evidence of a quick response to the appearance of new protocols, and of their listening to customer user groups as well as the size of the development team and participation in relevant standards development (e.g. openURL).
- Technical competencies of library staff.
- Current and predicted institutional initiatives, e.g. university portal or standardisation around one VLE.
- Pan-institutional initiatives, such as of JISC and the development path of its Information Environment (see Glossary; DNER 2001; Grout 2001).

The evaluation, purchasing and development of library portal solutions is an area that is ripe for cross institutional cooperation. This article has been written from the perspective of academic libraries, but it is likely that national, commerical, public and health libraries will also purchase such systems. International cooperation would also be of value. ARL has taken a leading role in surveying what libraries are doing and co-ordinating thoughts about requirements. The underlying library user requirements from LPS for many sorts of libraries may not be very different.

Given the complexity and rapid change in the systems available, cooperative work in defining user requirements and evaluating systems would be of great value. For a single library to undertake to evaluate all the available systems in depth is not practical. Furthermore, the very nature of the Web based technology in use makes experiments in integrating content using various systems possible, should the suppliers permit it. At the level of procurement, a model request for tenders could be produced and it would be of value to the library community to share information about the cost of licences, and licence terms. After implementation the sharing of configuration data would greatly reduce the load of maintenance of systems in use. And if the systems are to be effectively used, awareness on the part of data providers is necessary and briefing them could be another area for cooperative activity.

Predictions of how the market will develop over the next five years are risky, but need to be made. Looking at how the LMS market has developed long term it is likely that in that time frame systems will converge, offering very similar functionality and based on the same underlying technology. But metadata standards, data types and search protocols will continue to proliferate and evolve. Metalib and some others may become established as standalone products, with better functionality. But customers will probably opt for safety, meaning either sticking with their own LMS supplier or bandwagoning behind a few products. The role of consortial purchasing of systems integrating smaller institutions and collections with larger ones may also be significant: these consortia may not be so dependent on incumbent suppliers, creating new market opportunities, perhaps internationally. The benefits to users in terms of integrated access to multiple sources will be great, but not revolutionary in improving research. The increased access to information about patterns of use will make managing e-collections much easier; the possibility of applying and comparing quite precise performance indicators for libraries will be increased. But in fact the impact overall on the LMS marketplace could well be marginal, one or two players will be replaced. The areas of difficulty where competition will be focussed will be in maintaining larger and larger link databases, and above all in the area of taxonomic support in multi subject virtual collections. Electronic digital rights management is another challenge to be scaled. It is likely that something will come "out of left field" that offers a new vision of what needs to be achieved: e.g. powerful visualisation at the search interface or the idea of creating knowledge communities around library portals. However, while LPS already offers libraries powerful if expensive tools to make it easier for users to access heterogeneous information sources, it is unlikely that interfaces will become so simple that librarians will no longer need to give priority to training users in information skills and changing the culture of information use.

References

ARL (2002), *ARL Scholars Portal Working Group, Final Report*, available at: www.arl.org/access/scholarsportal/final.html (accessed 9 July 2002).

Armstrong, C.J., Lonsdale, R.E., Stoker, D.A. and Urquhart, C.J. (2001), *JUSTEIS Report*, available at: www.dil.aber.ac.uk/dils/Research/JUSTEIS/cyc1rep0.htm (accessed 10 September 2002).

Cox, A. and Yeates, R. (2002), *Library Orientated Portals Solutions*, available at: www.jisc.ac.uk/techwatch/reports/ (accessed 26 July 2002).

Gardner, M. and Pinfield, S. (2001), "Database-backed library Web sites: a case study of the use of PHP and MySQL at the University of Nottingham", *Program*, Vol. 35 No. 1, pp. 33-42.

Gardner, T. (2001), "An introduction to Web services", *Ariadne*, 29, available at: www.ariadne.ac.uk/issue29/gardner/ (accessed 10 September 2002).

HeadLine (2001), *Hybrid Library Requirements Defined by HeadLine*, available at: www.headline.ac.uk/public/diss/hl-hyblib-req.pdf (accessed 10 September 2002).

JISC (2002), JISC FAIR programme, available at: www.jisc.ac.uk/dner/development/programmes/fair.html (accessed 26 July 2002).

Paschoud, J. (2002), "Why librarians should care about VLEs", *Relay*, No. 53, March, pp. 10-13.

Pinfield, S., Eaton, J. and Edwards, C. (1998), "Realizing the hybrid library", *D-lib Magazine*, October, mirrored.ukoln.ac.uk/lis-journals/dlib/dlib/dlib/october98/10pinfield.html (accessed 27 January 2003).

Powell, A. and Lyon, L. (2002), "The JISC information environment and Web services", *Ariadne*, No. 31, available at: www.ariadne.ac.uk/issue31/information-environments (accessed 10 September 2002).

Roberts, A. (2002), "Creating an in-house content management system", *Vine*, forthcoming.

Robertson, S. and Reese, K. (1999), "A virtual library for building community and sharing knowledge", *International Journal of Human-Computer Studies*, Vol. 51 No. 3, pp. 663-85.

Russell, R. (1999), *MIA Requirements Analysis Study*, 22nd July, available at: ukoln.ac.uk/dlis/models/requirements/overview.html (accessed 10 September 2002).

Wetzel, K.A. (2002), *Portal Functionality Provided by ARL Libraries: Results of an ARL Survey*, June, available at: www.arl.org/newsltr/222/portalsurvey.html (accessed 10 September 2002).

Further reading

Blackboard (2002), "Endeavor announces ENCompass-Blackboard interface", June, available at: http://company.blackboard.com/press/viewrelease.cgi?tid=211 (accessed 10 September 2002).

Calhoun, K. *et al.* (2001), *Mixing and Mapping Metadata to Provide Integrated Access to Digital Library Collections: An Activity Report*, DC-2001, available at: research.nii.ac.jp/~oyama/dc2001/proceedings/product/paper-23.pdf (accessed 6 June 2002).

Chandler, A. and Jewell, T. (2002), *A Web Hub for Developing Administrative Metadata for Electronic Resource Management*, available at: www.library.cornell.edu/cts/elicencesestudy/home.html (accessed 16 April 2002).

Conacher, A. and MacColl, J. (2001), *Project AGORA: Evaluation and Case Study at the University of Edinburgh*, available at: www.sellic.ed.ac.uk/services/elec_lib/evalhybr.htm (accessed 5 June 2002).

Cox, A. (2001), "Integrated access to information regardless of its location or format", *Vine*, Vol. 123, September, pp. 64-7.

Davidson, L. (2001), "Integrating access to digital collections: MAP from Innovative Interfaces", *Vine*, Vol. 125, December, pp. 49-55.

Decomate project (2002), available at: infolab.kub.nl/prj/past/decomate/ (accessed 10 September 2002).

DNER (2001), *Information Environment: Development Strategy 2001-2005 (Draft)*, 22nd November, available at: www.jisc.ac.uk/dner/development/IEstrategy.html

Dorman, D. (2001), "Technically speaking", *American Libraries*, December, available at: www.ala.org/alonline/ts/ts302.html (accessed 10 September 2002).

EASEL project (2002), available at: www.fdgroup.com/easel/ (accessed 10 September 2002).

e-Government Interoperability Framework (e-GIF) (2002), Version 4 (25 April 2002). (UK Government. Cabinet Office. Office of the e-Envoy), available at: www.govtalk.gov.uk/interoperability/interoperability.asp (accessed 10 September 2002).

Ex Libris (2002), "World's largest academic consortium chooses SFX", press release 15 June, available at: www.sfxit.com/news/press_initial.html#csu (accessed July 2002).

Fretwell-Downing Informatics (2002), *Fretwell-Downing Informatics Works with Member Libraries of the North American "Association of Research Libraries" (ARL) to produce Scholars Portal*, available at: www.fdgroup.co.uk/fdi/pdf/arl.pdf (accessed 26 July 2002).

Gambles, A. and Paschoud, J. (2001), "Evaluation of MetaLib/SFX", unpublished report.

Grout, C. (2001), "Journals and the information environment", unpublished briefing paper.

Harris, N.V. (2002), "Customisation and personalisation literature review", unpublished report, available at: www.angel.ac.uk

Huwe, T. (2002), "Turbo-powering the flat portal: the University of California's Labor Research Web", *Online*, Vol. 26 No. 3, available at: www.infotoday.com/online/may02/huwe.htm (accessed 10 September 2002).

Journal Web cite (2002), available at: www.journalwebcite.com (accessed 10 September 2002).

Lewis, N. (2002), "Talking about a revolution? First impressions of Ex Libris's Metalib", *Ariadne*, No. 32, www.ariadne.ac.uk/issue32/metalib (accessed 10 September 2002).

MacColl, J. (2002), "VLEs in the learning landscape", *Relay*, No. 53, March, pp. 7-9.

Okerson, A. (2001), "ICOLC Portal presentations", posted to jisc-ecollections@jiscmail.ac.uk in October 2001 by Alicia Wise.

Platt, N. (2001), "Electronic resources management", *Integrated Library System Reports*, Spring, available at: www.ilsr.com/erm.htm (accessed 10 September 2002).

Serials Solutions (2002), available at: www.serialssolutions.com/products.asp (accessed 26 July 2002).

SwetsNet, Navigator (2002), available at: www.swetsnet.com (accessed 26 July 2002).

TDNet (2002), available at: www.tdnet.com (accessed 26 July 2002).

UKOLN (2002), *UKOLN JISC IE Architecture*, available at: www.ukoln.ac.uk/distributed-systems/jisc-ie/arch (accessed 10 September 2002).

Appendix. Glossary

Athens – Eduserv service delivering "authentication, authorisation and distributed user administration services to UK" HE/FE. <http://www.athens.ac.uk/>

ELib – The UK JISC funded electronic library programme whose third phase funded research into the hybrid library.

JISC information environment – JISC's concept of secure and convenient access to a comprehensive collection of scholarly and educational material.

Fit to serve all sorts of digital content.

Fully supporting the submission and sharing of research and learning objects, providing a range of meaningful, rich and innovative methods of accessing electronic materials, to enrich and develop the learning and research process.

A collaborative landscape of service providers who work together to seamlessly cater for the needs of the community on a national basis.

Underpinned by real world interoperability, based upon a common standards framework and common semantic for digital resource description and access. <http://www.jisc.ac.uk/dner/development/IEstrategy.html>, also see UKOLN JISC IE Architecture Web pages, <http://www.ukoln.ac.uk/distributed-systems/jisc-ie/arch/>

OAI-MPH – the Open Archives Initiative's protocol for metadata harvesting <http://www.openarchives.org/>

Open linking – A NISO supported concept for using OpenURLs and link resolvers to select and present hyperlinks to appropriate related information resources independent of the original information resource. <http://library.caltech.edu/openurl/Presentations.htm>

OpenURL – A metadata transportation format, standardising the syntax but not the content search queries, planned for NISO trial late 2002. <http://library.caltech.edu/openurl/>

Web services – The term "Web services" has a specific meaning, it does not just refer to an information service on the Web say. They are interfaces for communication between two applications, using XML. In the same way that programmatic interfaces are available via HTML forms, programs are now able to call on each other by exchanging XML data through an interface, e.g. by using SOAP Version 1.2, the XML-based protocol produced by the XML Protocol Working Group.

XML is the standard language used by a Web service. A Web service will receive XML and send the output back as XML. The specification provides rigour, structure and a standard for importing information from location to location.

"The power of Web services, apart from their great interoperability and extensibility thanks to the use of XML, is that they can then be combined in order to achieve more complex operations. Several programs providing simple services can interact in order to permit complex operations" <http://www.w3.org/2002/ws/> <http://www.ariadne.ac.uk/issue29/gardner/>.

E-mail overload in the UK workplace

Jenni Ingham

The author

Jenni Ingham is Researcher at New Bridge Street Consultants, London, UK.
E-mail: jenni.ingham@nbsc.co.uk

Keywords

Electronic mail, United Kingdom, Problem identification

Abstract

Establishes whether e-mail overload exists in the UK workplace through a series of in-depth interviews. Evaluates the use of e-mail and attitudes towards its use in a business environment. Concludes that e-mail has recently penetrated into organisations as a business communication tool and that the level of seniority in a company impacts on the number of e-mails sent and received. Establishes that e-mail overload exists, although it is difficult to say to what extent, as e-mail usage is sometimes very personal. Devises a set of guidelines to give advice on how to manage incoming messages.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Introduction

Electronic mail (e-mail) is no longer just a method of communication, but a way of doing business; 94 per cent of businesses have access to the Internet and e-mail (Department of Trade and Industry, 2001). Individuals are becoming more dependent on e-mail technologies as a means to transfer and receive information. Before computers we communicated with each other face to face, by telegraph, by letter, by telephone or by fax. However, businesses can now send and receive e-mails via computers, and this has redefined the way in which we communicate (Whelan, 2000, p. 2).

There are several reasons why people and businesses choose to communicate more and more by e-mail. These include:

- cost;
- ease of use;
- convenience and speed.

With the seemingly overuse of e-mail this paper examines the impact it has on users' work and e-mail load, along with the problems of e-mail overload. E-mail overload occurs when the number of e-mails being sent and received becomes too difficult to manage, overwhelming the user.

Definitions

We have already defined e-mail overload, but two more terms need defining in the context of this article. They are e-mail, and the UK workplace.

E-mail is defined as:

> The sending of non-spoken information between individuals over a telecommunications network to a location where it is stored for subsequent retrieval, usually in a computer (New Shorter Oxford English Dictionary, 1993).

The UK workplace implies a variety of business and office environments and so is defined as: "A variety of offices covering different industries in the United Kingdom".

Aims

The main purpose to this study is then to establish whether e-mail overload exists in the

Aslib Proceedings
Volume 55 · Number 3 · 2003 · pp. 166-180
© MCB UP Limited
ISSN 0001-253X
DOI 10.1108/00012530310472651

Received 19 September 2002
Revised 17 December 2002
Accepted 8 January 2003

UK workplace. Studies into e-mail overload from the USA have been undertaken (for example, Whittaker and Sidner, 1997; Goldschmidt *et al.*, 2001). However, very little information exists with regard to e-mail overload in the UK. It is of interest to see whether the e-mail overload problem experienced, and reported, in the USA is beginning to trouble the UK workplace.

Although there has been much discussion regarding information overload and the problems associated with it (for example, Bawden, 2001; Reuters, 1996, 1997; Lewis, 1999), e-mail overload in the UK has only been discussed in press articles, and these often lack detailed analysis. A further intention of this study is provide a qualitative approach to establishing whether e-mail overload exists and to look into how e-mail is used in the workplace at a much more detailed level.

The specific objectives of the study were to:

- Identify how people use e-mail and their attitudes towards it and whether position in the company is an influence.
- Establish whether there are any guidelines for e-mail usage in the workplace and if this is an influencing factor on overload.
- Devise guidelines on how to effectively manage e-mail.

Literature review

History of e-mail

E-mail was first designed as an asynchronous[1] communication tool (Whittaker *et al.*, 1997, p. 276; Kimble and Abu Bajkar, 2001, p. 371; Adam, 2002, p. 88). It has now evolved to more that just a communication tool, for example, the inbox may act as a task manager rather than just a place to store messages.

E-mail is an evolution of a number of previous communication methods, including the electronic telegraph, the telephone, the telex network and the development of the Internet. In fact the first asynchronous e-mail message sent between computers took place as long ago as 1971 (Campbell, 1998). It is a communication tool that is being used more and more as it is a quick, cheap and an easy way to communicate across time zones. This benefit arises from the asynchronous nature of e-mail.

E-mail characteristics

Every method of communication has its place, however e-mail has proved itself to be a strong contender in many situations, especially business ones. It is quick and easy to use and information can be transmitted across the world simply and cheaply. Having said this, its strengths can also be its weaknesses. For example, it is very easy to copy multiple people into a message, but this can lead to the transmission of unwanted messages that annoy people and, in extreme cases, it can lead to system overload.

As noted earlier, there are a number of reasons why people choose to communicate via e-mail rather than by other communication methods. These reasons are also key defining characteristics of e-mail. These are summarised below.

- *Cost.* E-mail is relatively cheap, and information can be sent around the world for the same price as a local telephone call (Whelan, 2000, p. 4). On the other hand there are set up and hidden costs associated with e-mail, such as connection charges to an e-mail service provider, hardware and software for security functions and staff to train users or administer a helpline.
- *Ease of use.* For no extra cost numerous people can be copied into the same message, whilst reports, spreadsheets, presentations and other such information can also be included in the message. The ability to send files as attachments is a huge benefit to businesses, not only internally but also externally to clients. This can cause problems as the recipient may not be able to open the files, it is simple to forget to attach a file, it can take time to download a large file and viruses can be transmitted through attachments.
- *Convenience and speed.* One can send and receive messages whenever it is convenient, anywhere in the world, whilst at the same time messages can be sent around the world in a matter of minutes. In other words, e-mail is available 24 hours a day, seven days a week. This is a benefit of e-mail being an asynchronous communication tool. As quick as it is to send a message, some research suggests that, on average, it takes 30 minutes to write and send a business letter whilst only five minutes is spent on an equivalent e-mail message (Whelan 2000, p. 27).

This suggests that less time is taken over writing and thinking about the content of an e-mail, and spelling mistakes are nowadays fairly common in business e-mails. In a recent study it was found that there were 57 spelling mistakes per 100 e-mails (Mallon and Oppenheim, 2002, p. 15).

E-mail considerations for businesses

Along with the characteristics associated with e-mail, businesses also need to consider related issues. These include:

- *Liability/legal issues.* There have been a number of legal cases that have established that e-mail can be admissible as evidence. In a recent survey it was found that 53 per cent of UK employees have exchanged racist, sexist and other discriminatory messages by e-mail. Although it may not be the intention to be discriminatory or defamatory, employers can be liable for it (Stewart, 2002). A key case in this area is when Norwich Union Insurance Company had to pay £450,000 plus costs to a competitor after a defamatory e-mail was circulated (Nisse, 1997).
- *Security issues.* Security of e-mail, or lack of security, is a key issue for businesses. If the incorrect security measures are in place then it may be possible for people to read or change messages that have been sent by someone else. Similarly, it may be possible for people to hack[2] into another person's e-mail account and read, delete and send messages from that account. There are numerous security packages on the market and most businesses will have adequate security measures in place, such as a firewall[3]. Software is available to encode and transmit messages securely. Braue (2000) discusses several options in his article, including encryption software.
- *Volume of communication and overload.* There have been reports of e-mail creating information overload. In a survey by KPMG Consulting, in 1998, 27 per cent of business e-mail users considered the current level of e-mails they receive to be "excessive" or "intolerable" whilst 41 per cent believe that in five years' time the level of e-mails they receive will be "excessive" or "intolerable" (Whelan, 2000, p. 8; Dennis, 1998).

Information overload

It is important to understand the concept of information overload before discussing that of e-mail overload. There is no single definition of information overload, it has also been called simply too much information, info glut, or as Shenk (1997) puts it, data smog. A final term found in the literature, which is used to describe the problem of information overload, is information fatigue syndrome (Oppenheim, 1997, p. 246; Lewis, 1999, pp. 3-4).

The definition given by Bawden (2001) is the one closely linked to that of e-mail overload and is the definition used in this paper:

> Information overload occurs when information received becomes a hindrance rather than a help when the information is potentially useful.

Research has found that information overload can lead to stress, loss of job satisfaction and physical ill health (Lewis, 1999, p. 4).

E-mail overload

No formal definition of e-mail overload has been found in the literature, although Hiltz and Turoff (1985, p. 682) describe what information overload means in the context of computer-mediated communications systems (CMCS)[4]. They say that in the context of CMCSs the term information overload refers first to the delivery of too many communications and to an increase in social density that gives individuals access to more communications than they can easily respond to. They also use the term information entropy, which means that the incoming messages are not sufficiently organised by topic or content to be easily recognised as important. As a consequence they suggest that individuals might:

- fail to respond;
- respond less accurately than they would otherwise;
- respond incorrectly;
- systematically ignore (i.e. filter) some features;
- recode to a more compact or effective form; or
- quit (in serious cases).

Ferris Research (Ferris, 2000) established that corporate e-mail users spent five minutes a day dealing with each e-mail. With the average number of e-mails received a day in the UK being 39 (Pitney Bowes, 2000), on average, over three hours a day is spent dealing with e-mail. By comparison, recent research by the Department of Trade and Industry found that workers took an average of 49 minutes a day to sort out their inboxes (Lyons, 2002). The research does not mention whether this included replying to messages, which is implied when "dealing with e-mails" but not when "sorting out an inbox".

A study by the Chartered Management Institute (2001) found that 32 per cent of managers suffered from a deluge of e-mails. In another study from the Chartered Management Institute it was also found that the need to keep up with e-mails was ranked in tenth place in a league table of work stresses along with interruptions, deadlines and getting the right information. It was ranked higher than having a bad relationship, working environment or customer complaints as a cause of pressure and stress (BBC, 2000). With information being increasingly sent to individuals via e-mail, it raised the question of whether it is just managers it affects.

In a recent MORI survey of 200 UK managers and directors it was found that a quarter send over 30 e-mails a day, with a further 40 per cent sending between 11 and 30. It was also found that more that half the directors receive more that 20 messages a day (Flood, 2001).

E-mail overload solutions

Several recommendations on how to tackle e-mail overload have been made. Whittaker and Sidner (1997) recommended that e-mail systems should be redesigned to support filing and task management as well as producing asynchronous communication. This would mean that important messages were not lost and unanswered messages would not pile up.

Kimble *et al.* (2001, p. 371) suggested that the sender-side of e-mail communication should be focused on rather than the recipient-side. In earlier studies it has been established that one source of e-mail overload could be the misuse of the cc (carbon copy) facility found in e-mail systems (Kimble *et al.*, 1998, p. 411) and that a way to reduce e-mail overload would be to remove the cc facility (Kimble and Abu Bakar, 2001, p. 373). In the 2001 paper they described a prototype system where the sender could tag to whom each part of a message should be sent, and the recipient then only received the part that was applicable to them. In testing it was found that tagging was cumbersome and users would have to be familiar with HTML. At the same time the evaluators felt that time could be saved in a business situation and that its use could result in the reduction in the volume of e-mail received.

In reviewing the literature it has been found that solutions to e-mail overload have tended to be system based rather than user based. The most notable user studies have been those of Mandell (2001, p. 45), Sherwood (n.d.), and *Financial Mail on Sunday* (2000). They suggest:

- The establishment of a corporate e-mail policy.
- Using message headers to help decide what to, or not to, read.
- Marking urgent messages in the header field.
- Dealing with e-mails in order of priority.
- Setting aside time to review the day's messages.
- Setting up folders to file items away.
- Developing the habit of only handling messages once, deleting or filing them.

E-mail has developed rapidly in recent years, and technological developments (and popularity) suggest it may continue to develop and grow in the future. It has become a vital business communication tool due to it being fast, cheap and easy to use, a feature largely due to its asynchronous nature. However, ease of use makes it possible for communications and information to be spread far wider than has previously been possible, leading to the inevitable concerns about overload. The existence of e-mail overload appears to be largely anecdotal at the moment, suggesting that there is significant scope for this study to establish whether the phenomenon really exists.

Methodology

The methodology employed for this study involved the collection of qualitative and quantitative material through a series of in-depth interviews with 20 subjects. Quantitative data were collected from the interviewees in the form of a diary counting the number of e-mails sent and received in a week.

A cross section of interviewees were selected, differing in age, position within companies and industry in which they work. Selection started with personal contacts of the writer, which then snowballed as interviewees suggested other possible interviewees. It was decided to obtain a wide range of interviewees to see if any comparisons can been drawn between various groups of e-mail users. For example, does seniority or position within an organisation impact on a user's e-mail load?

The interviews were semi-structured, allowing scope for discussion. The interview schedule was adapted from that used by Whittaker *et al.* (1997, p 280) in their research into e-mail overload in the USA and consisted of the following parts:

- Section one dealt with generalities and demographic information. The interviewee was given the option to remain anonymous, but asked to provide age, gender and job title.
- Section two sought to establish how long the interviewee had been using e-mail and what they used it for.
- Section three questioned how the interviewee uses e-mail at work and their attitudes towards it.
- Section four enquired about their correspondence management, how they use the cc (carbon copy) and blind carbon copy (bcc) functions.
- Section five collected quantitative data regarding how many e-mails they sent and received.
- Section six enquired about their reading and reply strategies.
- Section seven asked about filing behaviour and collected more quantitative data about how many e-mails the interviewee had in their inbox and filing system.

It has been argued that one can be more confident in the validity of the findings if you take the interview findings back to the participant, otherwise known as respondent validation (Silverman, 2001, p. 233). Because of this a summary of the interview was sent to the interviewee shortly after the interview had taken place, along with the statistics they provided from their diary. This enabled them to comment on the findings presented to them before they were used in the paper. It also gave them the opportunity to furnish further comments that they may have not mentioned at the time of the interview.

Results and findings

The results of this study are reported in accordance with the interview schedule discussed above. They are supplemented by the results from the diaries of e-mails sent and received over a one-week period.

General e-mail questions

Table I shows how long each interviewee has been using e-mail in a work situation. A top left to bottom right trend in the number of years spent using e-mail, i.e. those who have used e-mail for the shortest period of time to be younger than those who have used e-mail for the longest period of time, would be expected. However this was not the case.

Those who were over 40 had been using e-mail for the same amount of time as those under 40. This says something about the recentness of the take-up of e-mail and its penetration into organisations as a business communication tool. This also implies that those in the 18-29 age bracket have been using e-mail nearly all their working lives. Only one interviewee has used e-mail for over ten years, but he is in the information technology and computing industry so this is to be expected.

From Table I it is possible to work out the average length of time an interviewee has used e-mail in a work situation. By rounding up the figures to the highest number in each category (i.e. assuming the interviewee has been using e-mail for six years if in the 5 to 6 category and that those in the over ten category have been using it for 15 years), then the average time an interviewee has used e-mail is 5.7 years.

E-mail is used for a variety of business purposes including: answering questions, arranging meetings, keeping up to date, networking, sharing ideas, social and general work correspondence. As well as general

Table I E-mail usage in the workplace

	Age			
Years using e-mail	**18-29**	**30-39**	**40-49**	**50 plus**
Under 1	1			
1 to 2	3			1
3 to 4	2			2
5 to 6	2		1	2
7 to 8		2	1	1
9 to 10			1	
Over 10		1		

communication, e-mail is used for sending other sorts of information, and the various uses stated by the interviewees are given in Figure 1.

As can be seen from Figure 2, the most popular reason for using e-mail is the convenience and speed that it offers. Auditing purposes, when you receive a message telling you if the recipient has read the message or not, and having a written record of what was said were also popular reasons.

Attitudes to e-mail

A total of 65 per cent of interviewees said that the vast majority of their work correspondence was sent via e-mail, with the remaining 35 per cent saying that most of their correspondence was sent via e-mail. These are significant statistics as one can see that e-mail has become the preferred form of communication in the business environment. Of those who said the vast majority of their correspondence was sent via e-mail, 46 per cent said that e-mail was by far the most dominant communication tool they used.

> The majority of my correspondence is sent by e-mail. In fact my correspondence is almost exclusively sent by e-mail. I have been in my recent role for nearly three years and wrote my first letter a couple of weeks ago – I did not even know which paper to use to print it out on (Interview ten).

Of the interviewees, 50 per cent classed e-mail as a "very useful communication tool", with the other 50 per cent saying it was just "useful". However, e-mail does have its problems, with 30 per cent mentioning the amount of spam or junk mail received. None of the 30 per cent had spam filters in place, whereas two other interviewees mentioned that they had spam filters in place and so were not so affected.

The interviewees were also asked which other communication tools they used. All mentioned the telephone (100 per cent). Figure 3 shows what other forms of communication were used, excluding the telephone. It is interesting to note that only one person mentioned using a mobile telephone as an alternative form of business

Figure 1 Information sent and received via e-mail

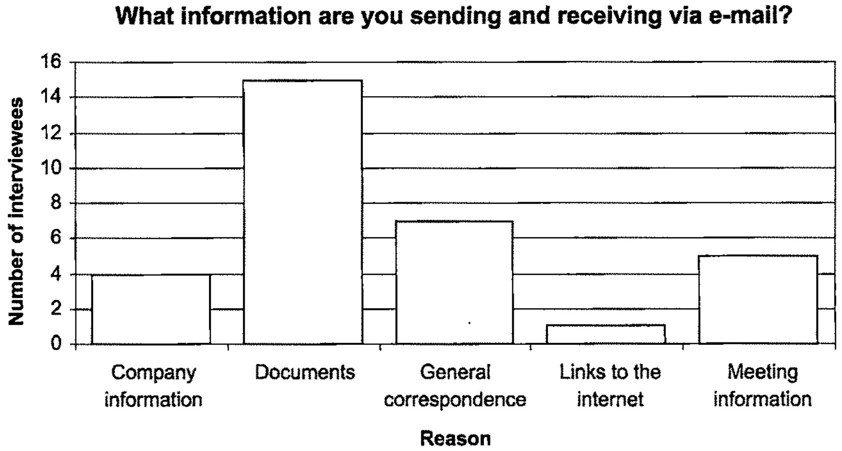


Figure 2 Why e-mail is used over other communication methods

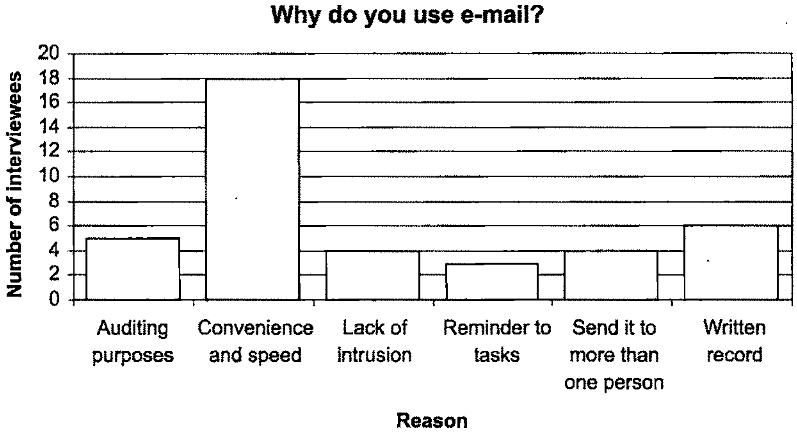
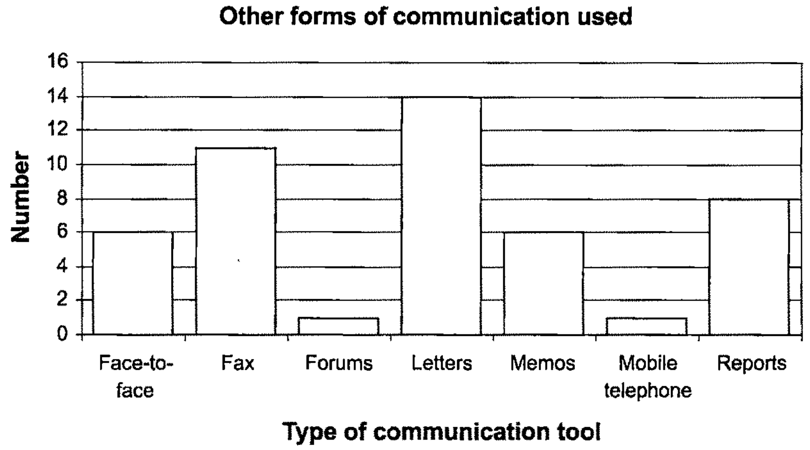


Figure 3 Other forms of communication used, other than e-mail



communication. Especially so, as it has been found that 86 per cent of businesses use mobile telephones (Whelan, 2000, p. 44). This could be because the mobile telephone is becoming synonymous with the traditional telephone.

The interviewees were also asked if e-mail had changed their working life in any way. Seven (35 per cent) of the interviewees said that e-mail had not changed the way they work as they had always had e-mail. The results from the other 13 interviewees (65 per cent) are in Table II, note that the interviewees were not limited to one answer.

Correspondence management

The next section in the interview examined the interviewees' use of the cc and bcc functions. It has been suggested by Kimble *et al.* (1998, p. 411) that a way to reduce e-mail overload would be to remove the cc facility and so it was important to establish if the use of cc and bcc impacted on the interviewees' work and e-mail load.

Table II How e-mail has changed the way people work

Has e-mail changed the way you work?	Number
Communication not as location specific	1
Created a workload that was not there before	1
Do not send as many faxes	1
Do not use the telephone as often	5
Do not write as many reports or memos	2
Do not write or send as many letters	6
Has changed – but not in a quantifiable way	1
Not as much face-to-face communication	2
Not so paper based – everything now sent electronically	1
Pattern of the working day has changed	1

All interviewees (100 per cent) used the cc function in their work correspondence, although 25 per cent of them either only used the feature occasionally or very occasionally.

There were a number of reasons given for using cc. The main reason for interviewees at staff level was to keep managers or other members of the team informed of what they were doing. For those at a more senior level the main reason to use the tool was to invite comments from other team members or other departments.

> I copy my boss into an e-mail as it is an easy way of keeping him up to date with progress on a project (Interview two).
>
> I use the cc feature as a means to inform those people who need to know of proposals, suggestions, developments and to invite their comments as appropriate (Interview eleven).

The number of interviewees who used the bcc feature was much less than the cc. Only 30 per cent of the interviewees said they used the bcc feature and then it was only on a very occasional basis. One interviewee uses it to keep managers informed, which was similar to his reason for using cc. Another used it to send messages to her home account to enable her to work on something at home. The reasons behind not using bcc were that it is a "devious" tool and that the other addressees should be aware to whom the message was sent. It is all about transparency.

Another consideration, when asking the interviewee about their cc and bcc use, was to establish whether or not other people within the workplace used the function and whether or not it affected their e-mail load. A total of 55 per cent of the interviewees said that the way other people used cc and bcc did affect their e-mail load, whilst 45 per cent said that it did not. The responses are very evenly split, however, when examining the data by level of seniority we see a difference. The three levels of seniority used in this study are staff, middle management and senior management.

Figure 4 shows how the use of cc and bcc increases the e-mail load as the level of seniority increases. The most senior are affected more by the use of cc or bcc than any other level, and those at staff level are the least affected.

This follows on from why people use the two features. As mentioned above, the main reason for using the features at a staff level was to keep managers informed of how work on a project or task was progressing. This would imply that managers are therefore receiving more messages that have been copied or blind copied to them for information, which in turn will affect their e-mail load. At a more senior level messages were being copied to other staff members for comment and therefore not necessarily being copied down to lower staff members. This implies that they are not receiving as many messages and therefore are not as affected.

Volume of e-mails sent and received

The next task in the interview was to establish how many e-mails were sent and received in a one-week period. These data are summarised in Table III.

Table III Number of e-mails sent and received by interviewee

Level	Interviewee No.	Received	Sent
Staff	1	96	17
Middle	2	80	100
Staff	3	65	60
Middle	4	45	28
Staff	5	250	250
Middle	6	74	57
Middle	7	52	22
Middle	8	222	107
Staff	9	30	9
Senior	10	130	39
Senior	11	62	50
Senior	12	60	19
Senior	13	25	20
Senior	14	87	98
Senior	15	350	250
Senior	16	89	31
Middle	17	110	68
Senior	18	17	12
Senior	19	100	82
Senior	20	600	450

From these data we can establish the mean number of e-mails sent and received from the interview group and also for each seniority level. The mean gives the average number of e-mails sent and received, and is calculated by summing the set of data values and dividing by the number of values. From the mean it is then possible to work out the standard deviation. This measures the spread, or dispersion, of the data around the mean. A high standard deviation implies a greater difference between cases. The results of these two calculations are shown in Table IV. The top calculation shows the data set as a whole, with the results for each of the calculations broken down to level of seniority.

It can be seen from Table IV that the mean number of e-mails sent was 87 a week, or 17 a day. The mean number of e-mails received a week was 127, or 25 a day. The figure of receiving 25 e-mails a day is much lower than that given by Pitney Bowes (2000), which was given as 39 a day a few years back. Staff

Figure 4 Level of seniority and effects of e-mail load using cc and bcc

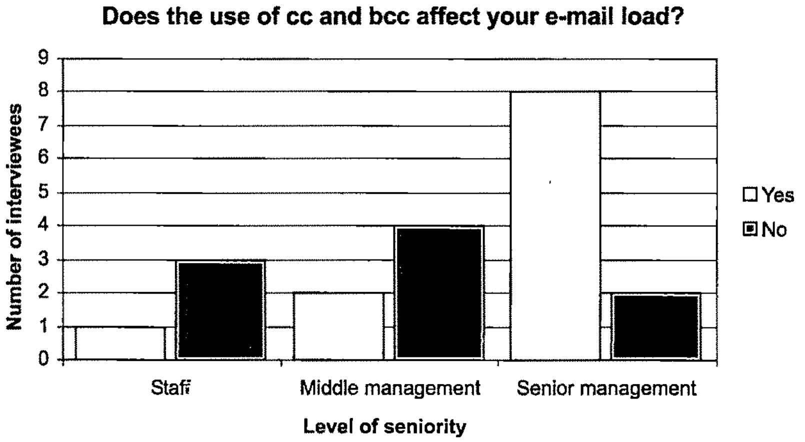


Table IV Mean and standard deviation of e-mails sent and received

		By level of seniority		
	Overall	**Staff**	**Middle**	**Senior**
Mean of sent items	87	77	64	105
Standard deviation of sent items	107	98	35	140
Mean of received items	127	110	97	152
Standard deviation of received items	139	97	65	140

receive 22 messages a day, middle management 19 and senior management 30, all of which are lower than the figure quoted by Pitney Bowes. This, however, conflicts with data from Xerox, who found that UK workers received 28 e-mails a day, which is more in line with the results presented here (*Sales Promotion*, 2001).

As mentioned earlier, the standard deviation measures the spread of the data from the mean. The lower the standard deviation the more close together the data. One can see from the calculations in Table IV that the data from all levels of seniority is fairly well spread. This can also be seen in Table III where one senior management interviewee received approximately 20 e-mails a week and another 600. The calculations show that the data given for middle management is most closely grouped, with that for senior management being the most diffuse.

From the diary data it was also possible to work out the average number of non-work related e-mails sent and received. On average, 21 non-work related e-mails are received on a weekly basis (or four a day), whilst seven non-work related e-mails are sent (just over one a day). This shows that using e-mail for a personal use whilst at work does not adversely impact on the number of e-mails sent and received.

Prioritisation, reading and reply strategies

The interview then moved to how long the interviewees spent dealing with e-mails on a daily basis. Figure 5 shows this graphically. As can be seen from the graph, the most time spent dealing with e-mails is between three and four hours, with the majority of interviewees spending up to an hour daily. By rounding up the figures to the highest number in each category, i.e. assume that an hour is spent dealing with e-mails if in the 30 minutes to an hour category, then the average time spent dealing with e-mails is approximately one hour 40 minutes a day.

In 2000 Ferris Research (Ferris, 2000) established that corporate e-mail users spent five minutes a day processing each e-mail. The question asked in this study was how long an interviewee spent dealing with e-mails, not simply reading e-mails coming in. Dealing with implies both sending and receiving. Therefore one needs to include e-mails that have been sent as well as received when calculating the average time. The average number of e-mails sent and received is 42. In which case an average user spends 2½ minutes dealing with e-mails in general.

However, the calculation should only use the number of e-mails received as, in the majority of cases, sending an e-mail is part of dealing with a received e-mail. Therefore the time spent dealing with e-mails is probably closer to 4 minutes than 2½ minutes. This is the view taken in this paper.

It is difficult to compare the figures presented here with those quoted by Ferris Research, as it is not entirely clear whether five minutes relates to sending and receiving e-mails, just sending or just receiving.

Taking this down to the level of seniority, as in Figure 6, one can see that it is the senior managers that spend the most time dealing with e-mails. This is in line with the mean number of sent and received e-mails – with senior managers sending and receiving the most e-mails.

Staff spent the least amount of time dealing with e-mails, but there is a variation in the data as one interviewee at staff level spent four hours dealing with e-mails daily and two others under 30 minutes.

Interviewees were asked if they felt the volume of e-mails affected their decision making. The reason behind this was two-fold. First, in the Reuters (1996) report *Dying for Information* it had been found that nearly half the managers questioned believed that important decisions were delayed and adversely affected as a result of having too much information. Second, it gave an insight into whether or not a user was overwhelmed by the number of e-mails they had and were therefore, by definition, overloaded.

Of the 20 interviewees, two felt that they could not answer the question, the percentages given are therefore based on 18 respondents. A total of 50 per cent felt that e-mail did not affect their decision making process in any way, with 50 per cent admitting that it did. Of the 50 per cent whose decision-making

Figure 5 Time spent dealing with e-mails daily

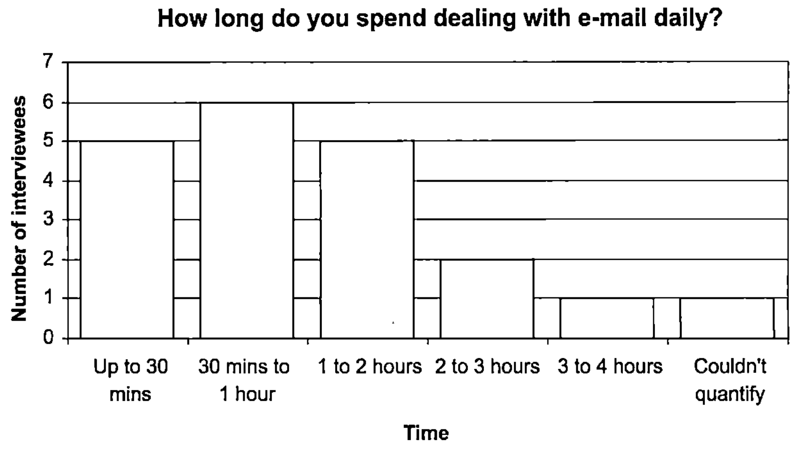
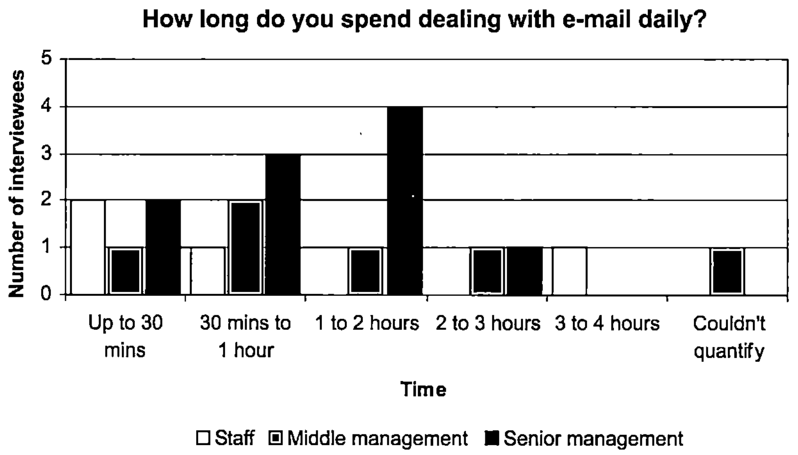


Figure 6 Time spent dealing with e-mails by level of seniority



processes were affected, 56 per cent said it was in a helpful way with 44 per cent saying it affected them adversely.

Table V provides an analysis by level of seniority and the decision-making process. One can see that it is middle and senior management who are most affected by e-mails, with 60 per cent of senior management and 50 per cent of middle management saying e-mail did affect their decision making. No interviewees at staff level found e-mail affected their decision making.

The two quotes below illustrate how e-mail can affect decision making:

Table V How e-mail affects the decision-making process by level of seniority

	Staff	Middle	Senior
Yes – it is a help	0	2	3
Yes – it is a hindrance	0	1	3
No – it does not affect me	4	2	3
No answer	0	1	1

> Sometimes I find I am not as thorough as I might have been, as I feel under pressure to reply to the e-mail quickly (Interview two).
>
> It is better as a consequence of what I can find out from it, I can gather intelligence through it (Interview fifteen).

As shown in Table V, four interviewees said e-mail was a hindrance rather than a help. Of these, two felt on top of the number of e-mails they sent and received, however, the decisions they were making had to be made more quickly than they would have liked as they had to move on and deal with the next e-mail. The other two interviewees showed signs of overload:

> E-mails are essential to my decision-making process, but when you've got lots of e-mails just to deal with them means that you make faster, less thought out decisions than you might do otherwise. Things start to get out of hand when there are a lot of unread messages interspersed with read ones. It's usually when I'm very busy and I have to be selective about what I read. But then I have to find the time to go through the rest ... (Interview ten).

> E-mails are disruptive to the decision-making process. If I start to get more than 30 e-mails in my inbox then I start to get anxious. E-mail is definitely a stressful medium (Interview nineteen).

Interviewee 19 mentioned a new symptom that influences the feeling of being overwhelmed and hence overloaded – information anxiety. Wurman (1989) first introduced the term information anxiety in his 1989 book entitled *Information Anxiety*. Since then there have been several articles relating to it. Information anxiety can have many forms, but the main one, and the one shown here, is the frustration that arises from the inability to keep up with the amount of data present in life (Shedroff, 2000, p. 220).

This suggests that e-mail anxiety is a condition associated with e-mail overload. It is defined by Brown *et al.* (2002, p. 7) as:

> The fear or apprehension associated with real or anticipated use of a computer to communicate [via e-mail].

Based on the definition from Shedroff (2000) for information anxiety and Brown *et al.* (2002) we can define e-mail anxiety as:

> A fear, sense of apprehension or frustration associated with the inability to keep up with the number of e-mails on a system.

With only two interviewees showing signs of overload, the question "is there a time when you do not feel on top of your e-mails" was asked to ascertain if e-mail can be overwhelming at times. Thirteen interviewees responded to this question, and of those, 70 per cent felt overwhelmed by the number of e-mails they had waiting on their system if they had been out of the office for a couple of days. So whilst only two exhibited symptoms of overload, 13 of the interviewees were aware that e-mail could get out of hand and could be difficult to control at certain times. Table VI shows the reasons why e-mails could get out of hand.

Table VI How e-mail can get out of hand

Reason	Number
Out of the office for a couple of days	9
Number of e-mails received from mailing lists	1
Not being able to clear the inbox at the end of the week	1
Lots of unread messages in the inbox	2

Table VII Mean number of e-mails on system by level of seniority

	By level of seniority			
	Overall	Staff	Middle	Senior
Mean number of e-mails in inbox	797	180	165	1,493
Mean number of files	19	16	15	23
Mean number of e-mails in files	2,058	489	421	3,866

Filing behaviours

Further to the number of e-mails sent and received, data were also collected relating to the number of e-mails in the inbox, the number of files the user had and the number of e-mails kept in these files. This is summarised in Table VII.

From Table VII we can see that the mean number of e-mails in the inbox was 797 and the mean number of e-mails filed was 2,058. This is the exact opposite to what was found in a US study in which it was established that the mean number of inbox items was 2,482, with the mean number of e-mails filed standing at 858 (Whittaker *et al.*, 1997, p. 281).

E-mail policies and guidelines

The interviewees were also asked if their companies had an e-mail policy, or basic e-mail guidelines, and whether this affected their filing behaviour. Often companies will place a limit on the number of e-mails an employee may have, so as not to slow up the system. Only 45 per cent of the interviewees said that their company had an e-mail policy or e-mail guidelines, 55 per cent said that there was none. This response was very surprising, especially as there are legal issues surrounding e-mail, such as being used as evidence in court. However, recent research has found that only 25-30 per cent of businesses do have an e-mail policy (Clearswift, 2002).

One aim of this project was to devise guidelines on how to effectively manage e-mail. These do not cover the legal aspects of e-mail use, such as monitoring or company disclaimers as this was outside of the study's remit. Based on points raised in the literature review and during the interviews, the following guidelines have been developed. They have been devised with reference to Mandell (2001, p. 45), Ferris (2000), Hogg (2000), Sherwood (n.d) and *Financial Mail on Sunday* (2000). It was also possible to refer to a set of "e-mail golden rules", which were mentioned by interviewee two, when devising these guidelines.

E-mail guidelines and etiquette

(1) *Choose the right communication method*:
  - E-mail is not always the best communication tool to use.

- Do not forget that other methods can be better at times. Talking to someone or picking up the telephone may often save time and misunderstandings.

(2) *Make messages clear*:
  - Give e-mails informative subject headings to enable people to organise and prioritise work. Explain why the reader has your message and what is needed from them.
  - Summarise key issues of an attachment in the main body of the e-mail.
  - Think whether the attachment really needs to be sent. Set up shared drives for documents and information used as a department or team.

(3) *Style*:
  - Write your message in clear, plain language:
    - – check your spelling and grammar before sending a message;
    - – avoid sending very long messages.
  - Be polite, employees have been sacked for sending e-mails of a defamatory nature.

(4) *Addressing*:
  - Do not over use the cc or bcc functions – remember their usage affects other people's e-mail load. Think: does this person really need this message before including them?
  - Do not automatically "reply to all".
  - Check that you have chosen the correct address before sending a message.

(5) *Dealing with incoming e-mails*:
  - Delete junk mail immediately and set up filters to stop them entering inbox.
  - Read e-mails on a daily basis. Deal with them in order of priority
  - Respond to important messages immediately.
  - Try to handle messages only once. Then either delete or file immediately.
  - Be selective with the number of mailing lists subscribed to. Are they a necessary part of the job?
  - On holiday?
    - – set up an out of office reply so the sender knows when you will be back;
    - – give another contact name who may be able to help in your absence.

(6) *Setting deadlines via e-mail*:
  - Be realistic, explain why such a deadline has been set, and remember:
    - – colleagues have other priorities;
    - – not everyone works full-time.
  - Mark urgent messages clearly in the subject header.

Conclusions and recommendations

E-mail in the workplace is used for a variety of purposes, including arranging meetings, networking and keeping-up-to-date. E-mail comes into its own when sending and receiving information and it is incredibly useful for sending around documents and attachments.

All this is reinforced by the finding that 65 per cent of interviewees said that the vast majority of their work correspondence was sent via e-mail, with the remaining 35 per cent saying they used e-mail most of the time for work correspondence. With the average length of time the interviewees have had e-mail being 5.7 years, and 65 per cent saying that the vast majority of their work correspondence was sent via e-mail, then e-mail has had a very significant impact, as a business communication tool, in a very short space of time.

E-mail has changed the way a lot of people work, however, seven (35 per cent) of the interviewees have had e-mail all their working lives and felt that it had not changed the way they worked in any way. Mostly the interviewees found that they did not use the telephone as often or did not write as many letters as they used to. This is also reflected in the figures above with 100 per cent of the interviewees using e-mail most of the time to communicate in a business environment. With 86 per cent of businesses using mobile telephones (Whelan, 2000, p. 44) it was surprising that only one interviewee mentioned this as an alternative communication tool. This could be because the mobile telephone is considered to be the telephone.

It has been suggested by Kimble *et al.* (1998, p. 411) that to reduce e-mail overload one should remove the cc and bcc facilities. Of the senior managers interviewed, 80 per cent found that the use of the cc and bcc function by other work colleagues did impact on their e-mail load, and that they received more e-mails as a result.

Senior management, on average, receive 152 e-mails a week, or 30 a day; whereas, on average, staff receive 110 e-mails a week and middle management 97. Similarly, senior management send more e-mails. On average, senior management sent 105 e-mails a week, with staff sending 77 and middle management 64. This explains why senior management complain of the use of the cc and bcc functions more than those at a lower level.

Whether the cc and bcc functions should be removed or not is a different matter. All interviewees said that they were a useful tool to have. They are used primarily to keep people informed of what is happening in the company and to collect comments about a certain issue from other colleagues. Guidelines in their usage may be more effective than removing the facility altogether.

This study has found that the average time spent dealing with e-mails is approximately 1 hour 40 minutes a day. Using this and the fact that the average number of e-mails received daily is 25, then it takes about four minutes to deal with each e-mail. It is assumed here that, in the majority of cases, sending an e-mail is part of dealing with a received e-mail and so the figures for sent e-mails need not be included in the calculation. Again it is senior management who spend the most time over e-mails, which is in line with the fact they send and receive more of them.

On a weekly basis, an average of 21 non-work related messages were received and seven sent weekly. Therefore personal, non-work related messages do not adversely affect the overall number of e-mails being sent and received.

The interviewees were also asked about their filing behaviour. It was found that the average number of e-mails in an inbox was 797. The average number of files, other than the inbox, stood at 19, with the average number of e-mails in files being 2,058. As can be seen, the average user has a significant number of e-mails and information to deal with.

Nine out of 13 interviewees (70 per cent) were aware that e-mail got out of hand and was difficult to control at certain times. The reasons behind this included being out of the office for a couple of days, the number of e-mails received from mailing lists and having lots of unread messages amongst the read messages.

Of the 13, two interviewees showed clear signs of overload. One interviewee felt the number of e-mails he had to deal with was overwhelming, whilst the other mentioned feeling anxious when the number of e-mails in his inbox went above 30. Information anxiety was not a symptom originally identified as a sign of overload but is certainly one to be taken into consideration when identifying overloaded e-mail users. It also suggests that e-mail anxiety, rather than information anxiety, should be a condition associated with e-mail overload.

Hiltz and Turoff (1985, p. 681) found that feelings of overload would generally reach a peak in the early stages of using e-mail, when users had gained enough familiarity to cause a large number of messages to arrive, but not enough to know how to deal with them. This is not in line with this study. Here the two interviewees showing signs of overload in this study have been using e-mail for six and nine years respectively.

Only 45 per cent of the interviewees said that their company had an e-mail policy, with one of these also mentioning a set of "golden e-mail rules". This is surprising due to the legalities associated with e-mail.

As a result of this study a set of e-mail guidelines have been devised. It is hoped that these will help users to effectively manage their e-mail load.

Whilst it has been established that e-mail overload exists, it is difficult to say to what extent it exists as data were only taken from a very small number of people and organisations. E-mail overload is a very personal experience. One person may receive 200 messages a week and not feel overloaded, whilst another may also receive 200 messages a week and feel overwhelmed by them and hence overloaded. As e-mail is such a personal medium, guidelines are the most appropriate way of helping deal with the overload problem, as they can be adapted for personal use.

A logical step from this study would be to examine the extent of e-mail overload in separate industries rather than the workplace as a whole. Similarly, a detailed case study of one organisation would also be beneficial, with further research into how an organisation communicates with its staff. This would also enable more detailed analysis into how e-mail is used in the workplace and the extent to which e-mail overload affects employees.

Further recommendations for research include:

- Research into junk mail and the extent it affects e-mail users.
- The impact of mobile telephones in organisations.
- Research into the effect of introducing e-mail guidelines to an organisation and whether the number of e-mails sent and received changes over a period of time.
- Looking into how widespread e-mail policies are in the workplace and what the legal implications are for not having one, there is an opportunity here to look at a specific industry.

Notes

1 Asynchronous means that the sender and receiver of a message do not need to be online at the same time because messages are stored until retrieved by the recipient.

2 Hacking is when someone gains unauthorised access to computer files or information held on a computer (*The New Shorter Oxford English Dictionary*, 1993).

3 A firewall is a piece of hardware or software which performs a screening process on communications from networks external to organisations, with the aim of blocking unauthorised access while permitting outgoing communication (*Oxford English Dictionary Online*, 2001).

4 Computer-mediated communication systems use computers and telecommunications networks to compose, store, deliver and process communication, this includes e-mail, computerised conferencing and bulletin board systems (Hiltz *et al.*, 1985, p. 680).

References

Adam, R. (2002), "Is e-mail addictive?", *Aslib Proceedings*, Vol. 54 No. 2, pp. 85-94.

Bawden, D. (2001), "Information overload", *Library and Information Briefings Series*, No. 92, LITC, South Bank University, London.

BBC (2000), *E-mail Stress Overload*, news.bbc.co.uk/1/hi/uk/654956.stm (accessed 19 August 2002).

Braue, D. (2000), *Securing E-mail in an Insecure World*, available at: www.apcmag.com/apc/apcmag.nsf/1_alldocs/BCB2D52E9D469FCBCA256966001D0BE1 (accessed 11 September 2002).

Brown, S., Fuller, V. and Vician, C. (2002), *Individual Characteristics and E-learning: The Role of the Computer, Anxiety and Communication Apprehension*, available at: www.kelley.iu.edu/ardennis/wp/tr122-1.doc (accessed 11 September 2002).

Campbell, T. (1998), *The First E-mail Message*, available at: www.pretext.com/mar98/features/story2.htm (accessed 11 September 2002).

Chartered Management Institute (2001), *Workplace Revolution Jolts UK Managers*, February, available at: www.managers.org.uk/press/revolution.html (accessed 22 July 2002).

Clearswift (2002), *IDC's 'Policy-based Content Security' White Paper Stresses Increased Awareness and Importance of Content Security*, available at: www.clearswift.com/news/pressreleases/items/109.asp (accessed 31 August 2002).

Dennis, S. (1998), "Intranets equal info overload claims KPMG", *Newsbytes*, 14 April.

Department of Trade and Industry (2001), *Business in the Information Age: International Benchmarking Study*, available at: www.ukonlineforbusiness.gov.uk/main/resources/publication-htm/bench2001.htm (accessed 11 September 2002).

Ferris, D. (2000), *Drowning in E-mail Overload?*, available at: www.ferris.com/pub/FR-114-e-mailoload.html (accessed 19 February 2002).

Financial Mail on Sunday (2000), "Communication tools are becoming more of a hindrance than a help", *Financial Mail on Sunday*, 27 August.

Flood, G. (2001), "Management: e-mail overkill is a corporate malady", *Computing*, 22 February, p. 49.

Goldschmidt, K., Folk, N., Callahan, M. and Shapiro, R. (2001), *E-mail Overload in Congress: Managing a Communications Crisis*, available at: www.congressonlineproject.org/e-mail.html (accessed 23 July 2002).

Hiltz, S.R. and Turoff, M. (1985), "Structuring computer-mediated communication systems to avoid information overload", *Communications of the ACM*, Vol. 28 No. 7, pp. 680-9.

Hogg, C. (2000), *Internet and E-mail Use and Abuse*, Short Run, Exeter.

Kimble, C. and Abu Bakar, J. (2001), "Information overload and electronic mail: tagging message content – a partial solution?", *Proceedings of 6th UKAIS Conference*, University of Portsmouth, Zeus Press, Manila, pp. 371-80.

Kimble, C., Hildreth, P. and Grimshaw, D. (1998), "The role of contectual clues in the creation of information overload", *Proceedings of 3rd UKAIS Conference, University of Lincoln*, McGraw-Hill, New York, NY, pp. 405-12.

Lewis, D. (1999), *Information Overload: Practical Strategies for Surviving in Today's Workplace*, Penguin Books, Harmondsworth.

Lyons, J. (2002), *Working Parents "Spend Longer on E-mail"*, 19 May, Press Association, London.

Mallon, R. and Oppenheim, C. (2002), "Style used in electronic mail", *Aslib Proceedings*, Vol. 54 No. 1, pp. 8-22.

Mandell, M. (2001), "Preventing e-mail overload", *World Trade*, Vol. 14 No. 3, pp. 44-6.

New Shorter English Dictionary (1993), Oxford University Press, Oxford

Nisse, J. (1997), "NU to make e-mail libel payout", *The Times*, 18 July, p. 25.

Oppenheim, C. (1997), "Managers' use and handling of information", *International Journal of Information Management*, Vol. 17 No. 4, pp. 239-48.

Oxford English Dictionary Online (updated regularly), Oxford University Press, UK, available at: http://athens.oed.com/entrance.dtl (accessed 24 July 2002).

Pitney Bowes (2000), *E-mail or E-stress?*, available at: www.pitneybowes.co.uk/news/article.asp?article=103 (accessed 24 January 2002).

Reuters (1996), *Dying for Information: An Investigation into the Effects of Information Overload Worldwide*, available at: about.reuters.com/rbb/research/dying.htm (accessed 24 January 2002).

Reuters (1997), *Glued to the Screen: An Investigation into Information Addiction Worldwide*, available at: about.reuters.com/newsreleases/art_8-12-1997_id362.asp (accessed 13 August 2002).

Sales Promotion (2001), "UK e-mail overload", *Sales Promotion*, October, p. 4.

Shedroff, N. (2000), "Forms of information anxiety", *Business 2.0*, 28 November, p. 220.

Shenk, D. (1997), *Data Smog: Surviving the Information Glut*, Abacus, Tunbridge Wells.

Sherwood, K.D. (n.d.), *Tips for Overcoming E-mail Overload*, available at: www.overcomeemailoverload.com/advice/TopTenTips.html (accessed 24 July 2002).

Silverman, D.A. (2001), *Interpreting Qualitative Data: Methods for Analysing Talk, Text and Interaction*, 2nd ed., Sage Publications Ltd, London.

Stewart, G. (2002), "Danger lurking in e-mail", *Business AM*, 2 May.

Whelan, J. (2000), *E-mail@work: Get Moving with Digital Communication*, Pearson Education Limited, Harlow.

Whittaker, S. and Sidner, C. (1997), "E-mail overload: exploring personal information management of e-mail", in Kiesler, S. (Ed.), *Culture of the Internet*, Lawrence Erlbaum Associates, Mahwah, NJ, pp. 276-95.

Wurman, R.S. (1989), *Information Anxiety*, Doubleday, Garden City, NY.

After the disaster: drawing up the insurance claim

Robert Howes

The author

Robert Howes is based at the British Library of Political and Economic Science, London School of Economics and Political Science, London, UK.
E-mail: R.Howes@lse.ac.uk

Keywords

University libraries, Disaster planning, Floods, Insurance, United Kingdom

Abstract

Reports on the results of a major flood at the University of Sussex Library's repository at Lewes in October 2000, which severely damaged a collection of 42,000 books, 14,000 bound periodical volumes, microfilms, newspapers, report literature and other materials. It describes the way in which the detailed insurance claim was drawn up and the methodology used to quantify the losses, using a combination of machine-readable data, card catalogues and estimation. It also describes the methodology used to calculate the cost of restoration and the value for replacement purposes. The outcome of the claim and future plans for collection development at Sussex are summarised. The conclusion draws some general lessons for future disaster prevention on how to minimise risks from flooding and gives advice on insuring library collections as well as drawing up insurance claims after disasters.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 5 · Number 3 · 2003 · pp. 181-187
© MCB UP Limited
ISSN 0001-253X
DOI 10.1103/00012530310472660

Introduction

On 12 October 2000, a flood of unprecedented severity submerged the University of Sussex Library book repository at Lewes in East Sussex, immersing the stock held there in river water, which was contaminated with mud, sewage and oil. The repository contained books, periodicals, newspapers, microfilms and unique special collections, which formed an important part of the library's research collections. They had been outhoused at Lewes during prolonged building works for the extension and refurbishment of the main library and were all due to be returned to campus later in the year (*Library Association Record*, 2000).

There is now a considerable body of literature on disaster planning, which includes a number of published reports on individual disasters and some advice on insurance. (Butler, 1986, 1987; Cady, 1999; Eastwood *et al.*, 1978; Hammond, 1996; Kahn, 1994; Kennedy, 1995; Marrelli, 1983-84; Murray, 1985; Naslund and George, 1986; Paradine, 1995; Seal, 1984, 1985; Ungarelli, 1989, 1990). With each such occurrence, lessons are learnt which may help to avoid or mitigate similar catastrophes in future. The purpose of this paper is to summarise the experience of the University of Sussex Library and what it has learnt from this disaster, particularly in the areas of disaster prevention and insurance.

Disaster prevention

The University of Sussex Library had a disaster plan which, while not specifically referring to the Lewes repository, covered the main questions which were expected to arise in an emergency. The plan contained emergency procedures, floor plans, lists of supplies and suppliers, priorities for salvage, plans for IT recovery, inventories of furniture and equipment, and excerpts from reference works on how to handle different types of library materials. The library had set up and trained a disaster team and had provided two

---

The author gratefully acknowledges the advice and assistance in writing this article of Debby Shorley, University Librarian, and Noel Sladen, Insurance

Received 21 August 2002
Accepted 25 August 2002

cupboards of supplies intended to deal with small accidents, such as burst pipes.

In the event, the disaster was so catastrophic that most of this was of no use. A surge of water flowing down the River Ouse after a storm inland met the incoming high tide and burst over the river banks in a matter of hours. There were no staff in the repository at the time but eye-witnesses say that a small tidal wave rose up out of a nearby brook and completely flooded the repository within a couple of hours. Such was the pressure of water that the steel shutters on the loading bay were buckled inwards. Inside the results were spectacular. When staff were able to enter the repository on the fourth day after the flood they found a scene of complete devastation. The repository was a large single-storey warehouse, in which steel shelving had been arranged in two large blocks comprising 12 rows, mostly of 12 double bays with seven shelves, reaching a height of 2.3 metres, with a smaller block of shelving near the loading bay. Most of the shelving was full of stock comprising 42,000 books, 14,000 bound periodical volumes, around 6,500 unbound periodical parts, 20 hardcopy newspaper titles, mostly in newspaper boxes but some in bundles, 16 newspaper titles on microfilm and various unique special collections, mostly in archive boxes or open pamphlet boxes. The force of the water had knocked over most of the shelving in the loading bay and in the first block towards the left, while in the rear block about two-thirds of the shelving had fallen over towards the right. Some of the stock, particularly the bound periodicals, had remained wedged on the shelves as it swelled up and expanded. The rest had fallen on the floor or was trapped by fallen stack. At the rear of the store, there was simply a huge pile of books about two metres high. The water had reached a depth of four metres and taken three days to subside, so everything had been thoroughly soaked. Many of the books had floated around, filling the aisles and ending up far from their original locations. Bound volumes of the eighteenth century House of Lords *Journal* were found in the entrance hall while other books were wedged in the pipes and heaters high on the walls. Amazingly, a bowl of paper clips on a table was completely dry, so the table must have floated up on the rising tide and then been let gently down again as the water receded.

In these circumstances, there was no undamaged stock to rescue and nothing that the disaster team could have done by itself. Fortunately, as part of the disaster planning process, the library had registered as a priority user with both Harwell Drying & Restoration Services and Riley Dunn & Wilson. The Harwell representatives were on the scene on the day that staff first regained access to the building and began removing one of the priority special collections the following day. Subsequently, at the request of the loss adjusters, Riley Dunn & Wilson arranged for the entire remaining stock to be removed to freezer storage, which took some three weeks in all to complete. By the end, many of the remaining volumes were covered in mould. The sheer amount of material involved meant that it was not possible to keep records of individual items.

In retrospect, the main benefit of the prior disaster planning process turned out to be the knowledge acquired and the contacts made with salvage and restoration experts. Library staff had three days to consider what to do while they waited for the waters to fall and were to some extent psychologically prepared for the scale of damage they found when they were finally able to get back into the building. It was nevertheless an upsetting experience, particularly for the member of staff who had been responsible for the repository. Fortunately, because the repository was a remote closed-access store, day-to-day library services were largely unaffected (which was especially lucky as the flood occurred in the first week of the new academic session!). This reduced the immediate impact and allowed time for staff to plan the response to the disaster.

Insurance

The repository's contents were insured under the university's overall insurance policy with the Universities Mutual Association, UMAL, and reinsured with ACE Insurance S.A.-N.V. It soon became obvious that the damage would give rise to a large claim. For this reason, the loss adjusters changed their original advice that the stock should be jettisoned and insisted on removing it to freezer storage, even though mould had started to grow. A member of staff was charged with drawing up the claim and this took up a large proportion of his time for the next six months. The claim was expected to run into millions of pounds and for such a large amount the insurers required as much detail as possible. There were two major aspects to this:

(1) establishing exactly what was in the store; and
(2) estimating how much it was worth.

Like most university libraries, Sussex had a range of materials besides books and periodicals. The special collections comprised sheet music, technical reports, official publications, offprints, working papers and miscellaneous publications of all descriptions. Fortunately, the really valuable manuscript collections were housed safely in the strong rooms in the main library and were not affected by the flood. Most of the books in the repository formed part of the library's main collection and had been out-housed during the building works on campus. They were all catalogued and it was a relatively straightforward task to produce an accurate number of books and a listing of the bibliographic details of each title. Books that were out on loan at the time and so escaped damage were deducted from the total.

The library management system held catalogue records giving the bibliographical details of periodical titles, with holdings and locations. It also recorded individual bound periodical volumes but without any title information. It was thus possible to produce separately a list of the periodical titles and a count of the number of bound volumes damaged, but it was not possible to correlate the two. Furthermore, there were a considerable number of unbound periodical parts, which were not recorded on the computer because Sussex was at that time still using a manual check-in system. It was only possible to make an estimate of these based on the floorplan of the store, a sample count of shelves of unbound periodicals in the main library and some photographic evidence. The number of microfilms was calculated from the catalogue records and from accession cards. In the case of newspapers, we had records of the titles and dates held, so these were used as the basis of calculation.

The special collections caused the greatest difficulty. Two relatively small book collections were fully catalogued, so accurate records could be obtained from the computer. Another two collections were recorded on catalogue cards. Sample counts were done to produce an estimate of the total number of items in these collections. This was not entirely straightforward because many of the publications were serials or administrative reports and some catalogue cards had been used to record a number of issues. Two collections held on deposit had typescript catalogues, which provided fairly accurate numbers, and for another collection there was a typescript classification scheme, which gave an idea of the scope of the collection, although no numbers or bibliographic description. For the rest we had to rely on a small handbook to the special collections written eight years before the disaster, which gave estimated numbers for individual collections (Edgell and Ravilious, 1992). In addition, two architectural models which had associations with the original architect of the University of Sussex, Sir Basil Spence, had survived but in a damaged condition.

There were two basic options for recovering from the disaster: restoration or replacement. With the exception of the newspapers and microfilms, which were so damaged that they had to be discarded, virtually all the contents of the repository were salvaged and put into freezer storage, where their condition was stabilised pending a decision on the insurance claim. The restoration contractors then provided estimates of the cost of cleaning, drying and restoring the damaged materials. In one case the estimated cost was based on the number of pages per volume (i.e. price ranges based on 100, 200, 300 pages, etc.). Since even our computer-held catalogue records do not give pagination, we were unable to give exact figures for each item and so had to calculate on the basis of an average of 200 pages for academic monographs, 400 pages for bound periodical volumes and 100 pages for periodical parts, literary works, official publications and report literature. The cost of restoration was then calculated using these average figures and the number of items as set out above.

The cost of replacement was more difficult to calculate. In the end, it was decided to work on the basis of replacement using a mixture of new, second-hand and microfilm equivalents, depending on the particular type of material. For academic monographs, it was considered more appropriate to use the price of new books, since we were more likely to want to replace lost works with the latest editions. Using a break-down based on classmark and the average figures for new academic books by subject produced half-yearly by the Library and Information Statistics Unit (LISU) at Loughborough University, we were able to produce an accurate estimate of the cost of replacing the main collection books.

For periodicals, we sought replacement costs for individual titles and holdings (which, for the reasons explained above, we were not able directly to correlate with the cost per volume or part for restoration, although we were able to compare the relative total costs of both options). A list of periodical titles with holdings was output from the computer catalogue to a spreadsheet and then sent to the now-defunct Backruns Department of Dawson Books, who circulated it among specialist dealers worldwide. This took about three months, at the end of which Dawson's returned the spreadsheet to us annotated with the offers for various titles that it had received. We obtained quotes for about a third of the damaged titles this way (although not always for identical runs) and from this were able to calculate an average price per title. A value for all the lost titles was then calculated on this basis. For the sake of comparison an average price was calculated for microfilm replacements, using the price list displayed online on the UMI Web site, and a total obtained by multiplying up.

The newspapers were much more difficult. The *Guide to Microforms in Print* proved to be unreliable and it was necessary to check individual Web sites or contact individual suppliers by e-mail or fax. Some prices were obtained directly from suppliers' Web sites, either for individual titles (e.g. UMI) or as a standard charge per roll, which was then multiplied by the number of rolls (e.g. Library of Congress), but in most cases a specific price quote was obtained from the relevant supplier. No microfilm equivalent for some titles could be identified and in these cases a standard figure of one roll per year was assumed and then costed using the Library of Congress standard charge. This resulted in what was probably a very conservative estimate.

As described above, the special collections were very heterogeneous and so a variety of means had to be used to establish a replacement value. Most of the specialised book collections were costed using the LISU figures for new books. A collection of Quaker books owned by the local Society of Friends was valued by a specialist bookseller. The value of a historic collection on weights, measures and trading standards was estimated by checking titles against the online union catalogue of second-hand bookdealers at abebooks.com. Some 7 per cent of books were found and an average price calculated by multiplying up and adding some extra for known valuable items. This method worked in this specialised area but would be difficult to apply more generally. When a sample of the main collection books was checked, prices for the same edition were found to vary by a factor of three and for different editions of the same work by factors of ten, making it difficult to establish a reliable average. It also seems likely that expensive works do not appear on this catalogue, skewing the price range in a downward direction. For official publications and pamphlets, which scarcely figure in the second-hand market, an average value was calculated based on the cost of new official publications currently purchased by the University of Sussex Library. For technical reports, the cost of microfiche copies from the British Library Document Supply Service was used. Individual quotes were obtained for other items, such as the damaged architectural models.

Note that outsiders are often mystified by library jargon and librarians need to recognise that statistics kept for one purpose may not be of much use for another. For example, "item" provides an adequate term for measuring handling transactions, but for valuation purposes there is a great deal of difference between a bound periodical volume and an unbound periodical part or technical report. When talking about periodicals, it is easy to slip without thinking from the number of titles or subscriptions to the number of physical volumes or parts. Again, for valuation purposes, there is a great difference between the two but this is not immediately apparent to laypeople. It should also be remembered that in the UK, value added tax (VAT) is payable on most goods and services except for new or second-hand books and periodicals printed on paper. This affects the comparative costs of some options, for example, between restoration, which incurs VAT, and replacement by hardcopy, which does not, or between replacing periodicals with second-hand runs (no VAT) and microfilm (VAT payable). As many microfilms are priced in dollars or euros, fluctuating exchange rates may also affect the sums claimed or paid.

Besides the collections themselves, the flood caused other losses – notably the stack, which was distorted and contaminated and so could not be re-used, and various items of furniture and equipment. We had a detailed floorplan of the store at the time of the flood and so the number of shelving components could be accurately calculated. A price quote from a specialist contractor was obtained for the shelving, and trade catalogues used to price the other items of furniture and equipment. In retrospect, we might also have claimed for the house plants, which looked very sad after the flood! Whether a collection is replaced or restored, additional staff will be needed to process the stock and subscriptions. Staff costs were estimated on the basis of a two-year project requiring a project team composed of a professional librarian, a senior library assistant and two junior library assistants. These numbers represent one third of the collection management staff complement and recognise that it should be possible to reuse many bibliographic records. In point of fact, the length of such a project will depend on the recovery option chosen. If restoration is the preferred option, the rate of work will depend on the output of the restoration contractors and is likely to take longer than straightforward replacement but working on a part-time basis. Besides staff, equipment, such as computers, and other sundry expenses, such as binding and security tags, must be allowed for.

The contractors who salvaged the collections from the repository sent in invoices, which were paid pending settlement of the claim with the agreement of the loss adjusters. In addition, there were substantial costs for the freezer storage of the damaged material and the final disposal of material that could not be restored. The rest of the university also had an interest in the collections, which have a potential to affect student recruitment, particularly of post-graduates, and the administration considered submitting a claim for financial loss under the "Business Interruption" policy, although in the event this was not pursued.

After a series of negotiations between the university, the loss adjusters, UMAL and the reinsurers, the claim was finally settled for £2.6 million. The settlement gave the university the freedom to restore or replace the damaged material, or to invest in new resources which would play an equivalent role in fulfilling its institutional mission. This recognises that research interests and teaching and learning methods have changed since the collections were first acquired. It also takes account of the practical difficulties of restoration: with the exception of some boxed items, the books in the store had become completely mixed up by the force of the flood and it was virtually impossible to identify individual items. It was therefore decided to restore a part of the Chester Music collection, which had survived relatively unscathed in boxes and had been salvaged early on before mould started to develop, but the remainder of the store's contents had to be written off and disposed of to a landfill site. Although there were a number of items and collections which would have been worth restoring, the difficulty of locating them meant that the cost could not be justified. Individual items will be replaced where a case can be made and the rest of the money is being used to expand the library's resources to meet the current needs of the university, particularly with enhanced electronic provision. Academics are being consulted for their views on replacements and new purchases.

Lessons for the future

The Lewes flood and its aftermath provide a number of lessons, which may be of interest to other libraries.

The first lesson is the vital importance of having adequate insurance cover. It is advisable to check with the organisation's insurance officer or agent to ensure that the costs of replacing or restoring stock, furniture and equipment are included, as well as the costs of processing and of maintaining business continuity. This is likely to involve making an estimate of the value of the collection, which may be particularly difficult in the case of unique archival collections. There may be a temptation to say that these are irreplaceable and therefore uninsurable but it is worth remembering that, with each major disaster, new lessons are learned about restoration techniques and it is now possible to save many items, particularly water-damaged material, which previously would have been written-off. Organisations also need to decide if they are going to insure on a like-for-like basis and whether to cover the whole cost of their collections or only part.

The second lesson is the value of having a written disaster plan. Although the plan had no direct effect on the outcome of the disaster, the reading and discussions that accompanied it were invaluable in helping us react to the flood. We already knew where to begin. As part of the planning process, we had registered as priority users with both Harwell Drying & Restoration Services and with Riley, Dunn & Wilson, which undoubtedly helped the salvage process.

A third lesson is the importance of keeping accurate records and statistics. Full bibliographic records are obviously the preferred solution, but even estimates, provided that they are reasonably accurate, are better than nothing. Dust may have to be blown off old catalogue cards which have not seen the light of day for years. Insurers are not prepared to accept unsubstantiated claims, rough estimates, roundings-up or back-of-an-envelope calculations. All aspects of a claim, both numbers and valuations, have to have some basis in proven reality. We were lucky in that most of our records were held in the main library and so were not affected by the flood, but it is wise to keep copies of records in a separate building wherever possible in case the main building is damaged or destroyed. Records should also be kept of actions taken in the aftermath of a disaster. It may not be possible to keep track of every item, since speed is of the essence in salvaging wet stock, but taking photographs and videos provides evidence of the extent of the disaster and the measures taken to react to it.

A fourth lesson is to be prepared to deal with professions and jargon with which most librarians do not normally come into contact. For example, there is an important difference between loss adjusters and loss assessors. Loss adjusters are usually appointed by insurance companies to deal with large claims. Their aim is to mitigate the loss and reach an agreed settlement by acting objectively between the two sides. They are paid by the insurance company and their costs do not come out of the claim. Loss assessors, on the other hand, act solely on behalf of the person or body which has suffered the loss. They receive a percentage of the final settlement as payment and so their aim is to obtain the largest possible amount. Their costs are not recoverable, however, and the size of the final pay-out received by the claimant is accordingly reduced. It may be necessary to appoint a loss assessor if an agreed settlement cannot be reached but librarians should beware of rushing to sign up assessors who arrive on the scene in the immediate aftermath of a disaster.

The final lesson concerns a simple but easily overlooked factor, namely the decision on location or the siting of the repository, which was the original cause of the disaster. The store was a modern rented warehouse located in a light industrial estate in what had once been the flood plain of the River Ouse. There had not been a flood in Lewes for 40 years, but older inhabitants remembered how it used to flood. The university officers responsible for selecting the building were concerned with risks such as vandalism, burst pipes and excessive daylight, but not with the danger of external flooding, which was not immediately obvious. When selecting a site for a new library or library store, it is therefore important to look at maps, talk to local inhabitants and if possible go up to a high vantage point to look for potential dangers outside and away from the building. Whether in point of fact we would have acted differently is another matter. The building was so superior to the others on offer that a risk assessment of a five-year lease in an area which had not flooded for nearly half a century might well have led us to consider it a risk worth running. Nevertheless, as events subsequently proved, the danger of flooding should be taken into consideration when deciding on the location of a building.

References

Butler, R. (1986), "The Los Angeles Central Library fire", *Conservation Administration News*, No. 27, pp. 1-2, 23-4.

Butler, R. (1987), "The Los Angeles Central Library: 'Nightmare, Part II'", *Conservation Administration News*, No. 28, pp. 1-2.

Cady, S.A. (1999), "Insuring the academic library collection", *Journal of Academic Librarianship*, Vol. 25 No. 3, pp. 211-15.

Eastwood, C.R., Collis, R.J. and Mort, G. (1978), "Fire!", *Library Association Record*, Vol. 80 No. 9, p. 455.

Edgell, J. and Ravilious, C. (1992), *Manuscript, Special and Out-of-Sequence Collections in the University of Sussex Library*, University of Sussex Library, Brighton.

Hammond, H. (1996), "Norfolk and Norwich Central Library: the emerging phoenix", *New Library World*, Vol. 97 No. 1130, pp. 24-31.

Kahn, M. (1994), "Fires, earthquakes and floods: how to prepare your library and staff", *Online*, Vol. 18 No. 3, pp. 18-24.

Kennedy, J. (1995), "Norfolk Record Office fire: an initial report", *Journal of the Society of Archivists*, Vol. 16 No. 1, pp. 3-6.

Library Association Record (2000), "The floods: huge losses at Lewes", *Library Association Record*, Vol. 102 No. 12, p. 663.

Marrelli, N. (1983-84), "Fire and flood at Concordia University Archives, January 1982", *Archivaria*, Vol. 17, pp. 266-74.

Murray, T. (1985), "Flood recovery in Tulsa", *Conservation Administration News*, No. 22, pp. 4-5, 20.

Naslund, C.T. and George, S.C. (1986), "Insurance settlement negotiation: a case study following a library disaster", *College & Research Libraries News*, Vol. 47 No. 5, pp. 325-8.

Paradine, T.J. (1995), "Business interruption insurance: a vital ingredient in your disaster recovery plan", *Information Management & Computer Security*, Vol. 3 No. 1, pp. 9-17.

Seal, R.A. (1984), "Insurance for libraries", *Conservation Administration News*, No. 19, pp. 8-9.

Seal, R.A. (1985), "Insurance for libraries", *Conservation Administration News*, No. 20, pp. 10-11, 26.

Ungarelli, D.L. (1989), "Are our libraries safe from losses?", *Library & Archival Security*, Vol. 9 No. 1, pp. 45-8.

Ungarelli, D.L. (1990), "Are our libraries safe from losses?", *Library & Archival Security*, Vol. 10 No. 1, pp. 55-8.

Emerald Fulltext

The online full text management research database

○ Full text access to the latest research and global thinking

○ Prestigious, peer reviewed management articles with user access for all – whenever, wherever

○ Sophisticated yet simple searching, with archives that significantly expand your library collection and training resources to encourage and support usage

○ Further Emerald products are available. Evaluate Emerald content for yourself – visit **www.emeraldinsight.com** for your 30-DAY FREE TRIAL!

Emerald

www.emeraldinsight.com

information ideas insight

Notes for contributors

Aslib Proceedings: New Information Perspectives

Copyright

Articles submitted to the journal should be original contributions and should not be under consideration for any other publication at the same time. Authors submitting articles for publication warrant that the work is not an infringement of any existing **copyright** and will indemnify the publisher against any breach of such warranty. For ease of dissemination and to ensure proper policing of use, papers and contributions become the legal copyright of the publisher unless otherwise agreed. Articles should be submitted by e-mail or on disc to:

The Editor

Professor David Nicholas, Head of Department,
Department of Information Science, City University,
Northampton Square, London EC1V 0HB, UK.
E-mail: nicky@soi.city.ac.uk

Editorial objectives

Aslib Proceedings: New Information Perspectives brings currency, authority and accessibility to the reporting of current research, issues and debates in the broad area of information work. Above all, the journal wishes to provide research and comment in a form that is easily and quickly understood: a fresh, rigorous, but unfussy, writing style is what is aimed for. The needs of busy practitioners (and academics) are very much in mind. Articles are refereed to meet the need for accredited and authoritative information. To ensure that this does not result in an unacceptable loss of currency, articles are speedily refereed by the journal's large, eminent and multi-disciplinary Editorial Board (assembled for just such a purpose). In some cases they may be referred to an external panel of consultants. The submission of research in progress articles is encouraged.

Final submission checklist

- Accurate, checked hard copy
- Abstracts and keywords
- Correct, complete Harvard references
- Figures and illustrations in electronic and hard copy form
- Text on labelled disk or CD-ROM or as attached file if requested by editor
- Completed/signed journal article record form

The boundaries of information work are rapidly changing and widening. *Aslib Proceedings* has a role to play in the repositioning of the information profession by encouraging submissions from information managers, providers, packagers and consumers of all kinds – and especially those from the related fields of journalism, electronic publishing, communication and Internet studies.

Manuscript requirements

As a guide, articles should be between 2,000 and 8,000 words in **length. A title** of not more than eight words should be provided. A brief **autobiographical note** should be supplied including full name, affiliation, e-mail address and full international contact details. Authors must supply an **abstract** of 100-150 words. Up to six **keywords** should be included which encapsulate the principal subjects covered by the article.

Where there is a **methodology**, it should be clearly described under a separate heading. **Headings** must be short, clearly defined and not numbered. **Notes** or **Endnotes** should be used only if absolutely necessary and must be identified in the text by consecutive numbers, enclosed in square brackets and listed at the end of the article.

All **Figures** (charts, diagrams and line drawings) and **Plates** (photographic images) should be submitted in both electronic form and hard copy originals. Figures should be of clear quality, black and white and numbered consecutively with arabic numerals.

Electronic figures should be either copied and pasted or saved and imported from the origination software into a blank Microsoft Word document. Figures created in MS Powerpoint are also acceptable. Acceptable standard image formats are: .eps, .pdf, .ai and .wmf. If you are unable to supply graphics in these formats then please ensure they are .tif, .jpeg, .bmp, .pcx, .pic, .gif or .pct at a resolution of at least 300dpi and at least 10cm wide. To prepare **screenshots** simultaneously press the "Alt" and "Print screen" keys on the keyboard, open a blank Microsoft Word document and simultaneously press "Ctrl" and "V" to paste the image. (Capture all the contents/windows on the computer screen to paste into MS Word, by simultaneously pressing "Ctrl" and "Print screen".)

For photographic images (plates) good quality original photographs should be submitted. If supplied electronically they should be saved as .tif or .jpeg files at a resolution of at least 300dpi and at least 10cm wide. Digital camera settings should be set at the highest resolution/quality as possible.

In the text of the paper the preferred position of all figures and plates should be indicated by typing on a separate line the words "Take in Figure (No.)" or "Take in Plate (No.)". Supply succinct and clear captions for all figures and plates.

Tables must be numbered consecutively with roman numerals and a brief title. In the text, the position of the table should be shown by typing on a separate line the words "Take in Table IV".

References to other publications must be in Harvard style and carefully checked for completeness, accuracy and consistency. This is very important in an electronic environment because it enables your readers to exploit the Reference Linking facility on the database and link back to the works you have cited through CrossRef. You should include all author names and initials and give any journal title in full.

You should cite publications in the text: (Adams, 1997) using the first named author's name. At the end of the paper a reference list in alphabetical order should be supplied:

For books: surname, initials, (year), *title of book*, publisher, place of publication, e.g. Fallbright, A. and Khan, G. (2001), *Competing Strategies*, Outhouse Press, Rochester.

For book chapters: surname, initials, (year), "chapter title", editor's surname, initials, *title of book*, publisher, place of publication, pages, e.g. Bessley, M. and Wilson, P. (1999), "Marketing for the production manager", in Levicki, J. (Ed.), *Taking the Blinkers off Managers*, Broom Relm, London, pp.29-33.

For journals: surname, initials, (year), "title of article", *journal name*, volume, number, pages, e.g. Greenwald, E. (2000), "Empowered to serve", *Management Decision*, Vol. 33 No. 5, pp. 6-10.

For electronic sources: if available online the full URL should be supplied at the end of the reference.

RSI
CALC
CENTRAL LIBRARY

Final submission of the article

Once accepted for publication, the final version of the manuscript must be provided, accompanied by a 3.5" **disk, Zip disk** or **CD-ROM** of the same version labelled with: disk format (Macintosh or PC); author name(s); title of article; journal title; file name.

Alternatively, the editor may request the final version as an attached file to an e-mail.

Each article must be accompanied by a completed and signed **Journal Article Record Form** available from the Editor or on http://www.emeraldinsight.com/literaticlub/jarforms.htm

The manuscript will be considered to be the definitive version of the article. The author must ensure that it is complete, grammatically correct and without spelling or typographical errors.

In preparing the disk, please use one of the following preferred formats: Word, Word Perfect, Rich text format or TeX/LaTeX.

Technical assistance is available from Emerald's Literati Club on http://www.emeraldinsight.com/literaticlub or by contacting Mike Massey at Emerald, e-mail: mmassey@emeraldinsight.com

Aslib Proceedings

New Information Perspectives

Volume 55 Number 3 2003
In 2003 this journal will consist of 6 printed issues delivered in 5 despatches
+ Internet Online Publishing with Archive, Active Reference Linking, Emerald WIRE, Key Readings,
Research Register, Non-article Content, Institution-wide Licence, E-mail Alerting Service and Usage Statistics

Contents

Number 3

114 Access this journal online

115 Abstracts & keywords

117 Knowledge sharing: a game people play
Alton Chua

130 Accountability and demonstration of the value of information services in South African law firms
Olwyn Garratt and Adeline du Toit

138 First steps towards providing the UK with health care information and advice via their television sets: an evaluation of four Department of Health sponsored pilot services
David Nicholas, Paul Huntington, Peter Williams and Barrie Gunter

155 Library portal solutions
Andrew Cox and Robin Yeates

166 E-mail overload in the UK workplace
Jenni Ingham

181 After the disaster: drawing up the insurance claim
Robert Howes

Emerald
www.emeraldinsight.com

Aslib Proceedings

New Information Perspectives

Library Link

www.emeraldinsight.com/librarylink

Aslib imi

INFORMATION MANAGEMENT

Emerald

www.emeraldinsight.com

Aslib Proceedings: New Information Perspectives
ISSN 0001-253X
©2003 MCB UP Limited

Aslib Proceedings: New Information Perspectives is a refereed journal of international repute that brings currency, authority and accessibility to the reporting of research, issues and debates in the broad area of information work.

Aslib Proceedings: New Information Perspectives is published in association with Aslib, The Association for Information Management.

Editor Professor David Nicholas
Head of Department, Department of Information Science, City University, Northampton Square, London EC1V 0HB, UK. E-mail: nicky@soi.city.ac.uk
Deputy Editor Dr Ian Rowlands
Senior Lecturer, Department of Information Science, City University, London, UK
Editorial Manager Kay Nicholas
Research Administrator, Digital Consumer Health Research Project, Department of Information Science, City University, London, UK
Editorial Assistants Peter Williams
Research Fellow, Department of Information Science, City University, London, UK
Paul Huntington
Research Fellow, Department of Information Science, City University, London, UK
Managing Editor Diane Heath

Editorial Board
Ralph Adam
Freelance Journalist, City University, London, UK
John Akeroyd
Director, Learning Resources, South Bank University, London, UK
Peter Chapman
Information Consultant, Banbury, UK
Professor Peter Cole
Head of Department, Department of Journalism, University of Sheffield, UK
Dr Tom Dobrowolski
Senior Lecturer, Institute of Information Science and the Book, University of Warsaw, Poland
Harry East
Honorary Research Fellow, Department of Information Science, City University, London, UK
Professor David Ellis
Research Director, Department of Information and Library Studies, University of Wales, Aberystwyth, UK
Professor Ben Fouche
Head of Department, Department of Information Science, Stellenbosch University, Matieland, South Africa
Eti Herman
Vice-Director, Library, University of Haifa, Israel
Robin Hunt
Senior Vice President, Sterling Group, New York, USA
Nat Lievesley
Network Manager, Centre for Policy on Ageing, London, UK
Helen Martin
Information Manager, Research and Information Unit, The Guardian, *London, UK*
Anthony Watkinson
Publishing Consultant, Oxford, UK
Richard Withey
Director, Independent Digital, London, UK

This journal is also available online at www.emeraldinsight.com/ap.htm

Internet services available worldwide on URL www.emeraldinsight.com

Emerald
60/62 Toller Lane, Bradford,
West Yorkshire, England BD8 9BY
Tel +44 (0) 1274 777700
Fax +44 (0) 1274 785200
E-mail **help@emeraldinsight.com**

INVESTOR IN PEOPLE

Aslib Proceedings: New Information Perspectives is one of the 21 titles published in the field of Library and Information services that support Library Link. Library Link is a world-wide network that revolves around an Internet forum. Its remit is to be a valuable free resource to librarians. This includes providing detailed information on current issues within the field of Library and Information services and putting members in touch with like-minded individuals world-wide.
To become a member, access the Library Link Internet site at: http://www.emeraldinsight.com/librarylink
Other titles published by Emerald in the field and featured at the Library Link site are: *The Bottom Line: Managing Library Finances, Campus-Wide Information Systems, Collection Building, The Electronic Library, Forthcoming International Scientific and Technical Conferences, Interlending & Document Supply, Internet Research, Journal of Documentation, Library Management, Library Hi Tech, Library HiTech News, Library Review, New Library World, OCLC Systems & Services, Online Information Review, Performance Measurement and Metrics, Program: electronic library and information systems, Records Management Journal, Reference Reviews, and Reference Service Reviews.*

ISOQAR QUALITY ASSURED FIRM ISO 9001
UKAS QUALITY MANAGEMENT 026
Certificate number ...LRS529...
Pre-press activities, comprising origination and pagination, associated with the publication of management journals

Regional offices:

For North America
Emerald, 44 Brattle Street, 4th Floor,
Cambridge, MA 02138, USA
Tel Toll free +1 888 622 0075; Fax +1 617 354 6875
E-mail **america@emeraldinsight.com**

For Japan
Emerald, Reina 308, 5-1 Sakae-cho, Kanagawa-ku,
Yokahama City, Kanagawa Prefecture, 221-0052 Japan
Tel +81 45 444 0388; Fax +81 45 444 0389
E-mail **japan@emeraldinsight.com**

For Asia Pacific
Emerald, 7-2, 7th Floor, Menara KLH, Bandar Puchong Jaya,
47100 Puchong, Selangor, Malaysia
Tel +60 3 8076 6009; Fax +60 3 8076 6007
E-mail **asiapacific@emeraldinsight.com**

Contact details
Customer helpdesk:
Tel +44 (0) 1274 785278; Fax +44 (0) 1274 785204;
E-mail **support@emeraldinsight.com**
Orders, subscription and missing claims enquiries:
Tel +44 (0) 1274 777700; Fax +44 (0) 1274 785200

Reprint service enquiries:
Carole Noble, Bradford
E-mail **cnoble@emeraldinsight.com**

Copyright permissions:
Charles Parker, Bradford
E-mail **cparker@emeraldinsight.com**

Missing issue claims will be fulfilled if claimed within four months of date of despatch. Maximum of one claim per issue.

No part of this journal may be reproduced, stored in a retrieval system, transmitted in any form or by any means electronic, mechanical, photocopying, recording or otherwise without either the prior written permission of the publisher or a licence permitting restricted copying issued in the UK by The Copyright Licensing Agency and in the USA by The Copyright Clearance Center. No responsibility is accepted for the accuracy of information contained in the text, illustrations or advertisements. The opinions expressed in the articles are not necessarily those of the Editor or the publisher.

Emerald is a trading name of MCB UP Limited

Printed by Printhaus Group Ltd, Scirocco Close,
Moulton Park, Northampton NN3 6HE

Aslib Proceedings: New Information Perspectives

Volume 55, Number 4, 2003 ISSN 0001-253X

Contents

190 Access this journal online

191 Abstracts & keywords

193 **Can remote Internet voting increase turnout?**
Susan Henry

203 **The British Life and Internet Project: inaugural survey findings**
Barrie Gunter, Chris Russell, Richard Withey and David Nicholas

217 **On open source IR**
Andrew MacFarlane

223 **Training cataloguing students using a mix of media and technologies**
Linda M. Cloete, Retha Snyman and J.C. Cronjé

234 **The enterprise portal – is it knowledge management?**
Marian Cloete and Retha Snyman

243 **Seeding a community of interest: the experience of the knowledge library project**
Andrew Cox, Keith Patrick and Rahman Abdullah

Access this journal electronically

The current and past volumes of this journal are available at

www.emeraldinsight.com/ft

You can access over 100 additional Emerald journals, each with a comprehensive searchable archive of articles (many dating back to 1989), a detailed classification system and links to referenced material.

See page following contents for full details of what your access includes.

Emerald

Access this journal online

www.emeraldinsight.com/ap.htm

As a subscriber to this journal, you can benefit from instant, electronic access to the content of this title. Your access includes a variety of features that increase the value of your journal subscription.

Automatic permission to make up to 25 copies of individual articles

This facility can be used for teaching purposes, training courses, meetings or seminars. This only applies to articles of which Emerald owns copyright. For further details visit **www.emeraldinsight.com/copyright**

How to access this journal electronically

To benefit from electronic access to this journal you first need to register on the Internet. Registration is simple and full instructions are available online at **www.emeraldinsight.com/register** Once completed, your institution will have instant access to the journal content from **www.emeraldinsight.com** or via the journal homepage **www.emeraldinsight.com/ap.htm**

Our liberal institution-wide licence allows everyone within your institution to access your journal electronically, thus making your subscription more cost-effective. Our Web site has been designed to provide you with a comprehensive, simple system that needs only minimum administration. Access is available via IP authentication or username and password.

Key features of Emerald electronic journals

Online Publishing and Archiving

You can gain access to past volumes as well as new material from this journal on the Internet via Emerald Fulltext. You can browse or search the database for relevant articles.

Key Reading

This feature provides abstracts of articles chosen by the journal editor on the basis of their subject-matter. These are selected to provide readers with current awareness of interesting articles from other publications within the same field.

Reference Linking

Direct links are provided from the journal article references to abstracts of the most influential articles cited (where possible this is to the full text of the article).

E-mail an Article

This facility allows you to e-mail relevant and interesting articles in PDF format to another PC for later use, reference or printing purposes.

Non-Article Content

The non-article content of our journals (product and materials information, industry trends, company news, etc.) is available online so that it can be accessed by users. It is possible to browse or search non-article content by keyword.

Additional Complementary Services Available

Your access includes a variety of features that add to the functionality and value of your journal subscription:

E-mail Services

Emerald's range of free e-mail alerting services is designed to deliver personal notification of news and features in a number of different interest areas.

Emerald WIRE (World Independent Reviews)

Emerald WIRE is a fully searchable, subject-specific database brought to you by Emerald Management Reviews. It provides article reviews from the world's top management journals. The database is updated monthly and gives users details of how to obtain the full text of original articles.

Research Register

Located at **www.emeraldinsight.com/researchregister**, the Emerald Research Register is an Internet research forum where you and your readers can identify information on research activity world-wide. This feature is invaluable if you are seeking information or wish to disseminate information about your own research.

Support Resources

Comprehensive librarian and user toolkits have been created to help you get the most from your journal subscription. For further information about what is available visit **www.emeraldinsight.com/usertoolkit**

Choice of Access

Electronic access to this journal is available via a number of channels, enabling end users and libraries to reach the content through their preferred delivery system. The Emerald Fulltext Web site – **www.emeraldinsight.com/ft** – is the recommended means of electronic access, as it provides fully searchable and high value-added access to the complete content of the journal.

Subscribers can also access and search the article content of this journal through the following journal delivery services:

EBSCOhost EJS
journals.ebsco.com

Huber E-Journals
e-journals.hanshuber.com/english/index.htm

Minerva
www.minerva.at

OCLC Firstsearch Electronic Collections Online
www.uk.oclc.org/oclc/menu/eco.htm

RoweCom's Information Quest
www.informationquest.com

SilverPlatter
www.silverplatter.com

SwetsBlackwell's SwetsWise
www.swetswise.com

Emerald Customer Support Services

For customer service and technical help, contact:
E-mail **support@emeraldinsight.com**
Tel +44 (0) 1274 785278
Fax +44 (0) 1274 785204

Emerald

Abstracts & keywords

Can remote Internet voting increase turnout?

Susan Henry

Keywords Elections, Government, Internet, Electronic data interchange, Local government, United Kingdom

In an effort to increase turnout at elections the UK government has been piloting electronic voting. At the 2002 local elections five councils tested remote Internet voting for the first time. Swindon Borough Council conducted the largest pilot, offering remote Internet voting to all voters. Almost 15,000 voters were surveyed as to their motivation for choosing their voting method. Turnout did increase by 3.5 per cent but it is impossible to state conclusively that this was due to the availability of the Internet voting option, since most Internet voters were already regular voters. Future pilots should allow a more conclusive assessment of the impact on turnout of remote Internet voting.

The British Life and Internet Project: inaugural survey findings

Barrie Gunter, Chris Russell, Richard Withey and David Nicholas

Keywords Internet, Consumer behaviour, Interpersonal communications, United Kingdom

The British Life and Internet Project was launched in 2002 to explore the way people use the Internet in Britain. It will survey people online throughout each year on a range of topics linked to the use of the Internet. In the first survey that was conducted, just before Christmas 2002, respondents were asked a series of questions about their history of involvement with the Internet and the nature of their online behaviour. The findings indicated that online technology was used overwhelmingly for sending and receiving e-mails and for obtaining news and information linked to work and hobbies. Such is the demand of the Internet on the time of users that many acknowledged reducing the amount of time they spend on other activities, such as watching television, reading newspapers, and even going out to do the shopping. The Internet is, for most of its users, an important interpersonal communications medium, used to stay in touch and gossip with family and friends.

On open source IR

Andrew MacFarlane

Keywords Information retrieval, Open systems, Software engineering, Worldwide web

Open source software development is becoming increasingly popular as a way of producing software, due to a number of factors. It is argued in this paper that these factors may have a significant impact on the future of information retrieval (IR) systems, and that it is desirable that these systems are made open to all. Some problems are outlined that may prevent the uptake of open source IR systems and a number of open source IR systems are described.

Training cataloguing students using a mix of media and technologies

Linda M. Cloete, Retha Snyman and J.C. Cronjé

Keywords Cataloguing, Computer based training, Distance learning, Training, South Africa

The appropriateness of utilising a training resource programme consisting of a mix of media and technologies for the training of cataloguing students is evaluated. The findings from reported research and evaluation of the training resource programme made it possible to identify advantages and disadvantages of using such a programme. The results of the research enabled the researcher to derive guidelines for the design and development of a training resource programme consisting of a mix of media and technologies. The use of media and technologies, in a training research programme for cataloguing training, can be utilised in training cataloguing students in contact classes, distance education as well as in-service training.

The enterprise portal – is it knowledge management?

Marian Cloete and Retha Snyman

Keywords Knowledge management, Computer software, Culture (sociology), Change management, Information society

Currently we are in the middle of the information age, suffering from information overload on the one hand and a lack of knowledge on the other. Enterprise portals (EPs) are seen as the antidote to these problems by becoming more and more the

© MCB UP Limited · ISSN 0001-253X

ultimate knowledge management (KM) tool. The current hype about EPs is focused on their application as KM tools. Very little attention is given to other aspects of KM, namely the organisational, human and cultural aspects. The article will provide an overview of the technical and strategic relationship between EPs and KM and illustrate that EPs are only the technology component and should not be mistaken for the essence of KM. What is needed for successful KM in an organisation is not technology alone, but also a knowledge-sharing culture, knowledge-sharing policies, organisational processes, performance measurement and business strategies.

Seeding a community of interest: the experience of the knowledge library project

Andrew Cox, Keith Patrick and Rahman Abdullah

Keywords Virtual organizations, Knowledge management, Libraries, Librarians

The paper reports on the early lessons learned in the process of forming an online community for librarians from different organisations and sectors to discuss knowledge management. Time, critical mass, diversity of membership, focus, information and communication technology, incentives, concepts of membership, services and leadership were all factors in the slow coalescing of the group as an active self-sustaining network.

Can remote Internet voting increase turnout?

Susan Henry

The author

Susan Henry is Senior Information Assistant at the Centre for Information Behaviour and Evaluation of Research (ciber), Department of Information Science, City University, London, UK.

Keywords

Elections, Government, Internet,
Electronic data interchange, Local government,
United Kingdom

Abstract

In an effort to increase turnout at elections the UK government has been piloting electronic voting. At the 2002 local elections five councils tested remote Internet voting for the first time. Swindon Borough Council conducted the largest pilot, offering remote Internet voting to all voters. Almost 15,000 voters were surveyed as to their motivation for choosing their voting method. Turnout did increase by 3.5 per cent but it is impossible to state conclusively that this was due to the availability of the Internet voting option, since most Internet voters were already regular voters. Future pilots should allow a more conclusive assessment of the impact on turnout of remote Internet voting.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 4 · 2003 · pp. 193-202
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310486557

Background

In the USA the development of electronic voting methods, including Internet voting, has been driven by a desire to find alternatives to the out-moded manual and mechanical systems currently used. In the UK, where voting has always been by paper ballot, a system in which the electorate has confidence, the impetus for the move towards electronic voting is primarily a desire to increase turnout.

A high turnout in an election is an indication that the electorate is engaged with the political process and gives elected officials a stronger mandate in office. Turnout in the UK, at both general and local elections, has been declining in recent years. In the 2001 general election turnout was only 59 per cent, a fall of 12 per cent from the previous general election in 1997; it was the lowest turnout since 1918. While most non-voters, when asked, will cite a lack of knowledge or interest in the political process, or express the opinion that their vote will have little impact on the outcome, some also cite the inconvenience of the voting procedure (Diplock, 2001). The current government, as well as exploring ways in which to engage potential voters in the political process, has also been keen to consider new methods which might encourage a higher turnout by making it easier and more convenient to cast a vote.

In the 2000 local elections 32 local authorities piloted variations of electronic voting and counting and all-postal voting. The electronic voting methods were not very successful in increasing turnout since they still required voters to attend a particular place on a particular day, though the counting process was speeded up considerably. The all-postal voting pilots were very successful in terms of an increased turnout. In Swindon, the four wards that tested all-postal voting saw a dramatic increase of turnout. Penfield ward, for example, had a turnout of 19.5 per cent in 1999, which increased to 30.9 per cent in 2000.

The success of these pilots, in terms of achieving a secure and efficient election, led the government to pilot other methods and refine the already piloted methods. The

Received 16 February 2003
Revised 16 April 2003
Accepted 21 April 2003

primary aim of the 2002 pilots was to find methods that were:

> ... readily accessible to all electors given today's lifestyles and the work and family commitments so many people have (DTLR, 2001).

The Department of Transport and Local Regions (DTLR)[1], who oversaw the pilots, considered that remote methods such as telephone or Internet voting might be the best way of achieving the government's aim of making voting as convenient and as attractive as possible. Early voting (i.e. for a period prior to the national polling day) was also tested for this reason. In the 2002 local elections early remote Internet voting was piloted by five authorities, early telephone and text message voting, as well as variations of electronic and all-postal voting, were also tested by a total of 30 authorities.

Opinion about Internet voting as an alternative voting method is divided. Remote Internet voting, casting a vote via any computer located somewhere other than in a designated polling place, is particularly contentious because there is no possibility of checking who is casting the vote, whether they are doing so under duress or whether the computer or voting software has been subjected to any tampering or interference. In the USA, where Internet-enabled elections have taken place, organisations, such as the Voting Integrity Project[2], have opposed them believing that as long as Internet voting is not the only alternative method available and while it does not offer security and privacy for voters it should not be used (Phillips and Jefferson, 2000). The Voting Integrity Project favours methods such as postal voting until such time as the digital divide has been bridged or is not so wide and is particularly wary of remote Internet voting, which it believes is very vulnerable to breaches of security and privacy.

Companies, such as Election.com Inc., who organised the first Internet-enabled election (the Arizona 2000 Democratic Primary) counter that the problem of a digital divide can be, and in Arizona was, overcome through an "aggressive outreach program" and by providing a range of ways for the electorate to cast its vote (Mohen and Glidden, 2001).

A Californian task force, headed by Bill Jones, investigating the feasibility of Internet voting, came to a similar conclusion as that of the Voting Integrity Project (California Internet Voting Taskforce, 2000). It found that the barriers, including legal and fiscal issues as well as security and practicality, make remote Internet voting unfeasible at present. It suggests that Internet voting should be phased-in over four stages. The report does not offer a time scale but recommends that, as each stage is successfully attained, the next should be tested. The four stages suggested are:

(1) Internet voting at polling stations;
(2) Internet voting at any polling station;
(3) remote Internet voting from county computers or kiosks; and
(4) remote Internet voting from any Internet connection.

The first Internet-enabled election in the UK was effectively starting at the fourth stage, potentially the most high risk Internet voting method, though certainly the one offering voters the most convenience, particularly when combined with an extended voting period.

Aims, objectives and scope

This study intended to:

- *Examine the feasibility of Internet voting.* This method had not been used in a public election in the UK before and so was new to voters. Does it work? Does it offer voters a secure, secret and accountable voting method?
- *Ascertain whether it is attractive to voters.* Were voters willing to use the method? Was it easily understandable? Did they have confidence in it?
- *Determine whether it will increase turnout by attracting new voters.* Did more people vote than in past years and were a significant number of votes cast online by previous non-voters?

Focus on Swindon

The research focused on Swindon because it offered the largest coverage (126,953 voters) of all the pilot schemes. Swindon was piloting Internet voting in all 19 of its wards that were holding an election, whereas the other councils were only piloting in two or three wards. Swindon voters had the choice to vote via the Internet, the telephone, by post or in the traditional manner at the polling station.

Swindon is situated in the South West of England, and is about an hour from London by rail. It has good rail and road links; the M4 passes close by, making it very accessible and therefore attractive both for employers and employees. The railways used to be the major employer but now large manufacturing companies and several multi-national companies have premises there. The population is increasing, attracted by the low unemployment rate and the new housing developments. The current electorate stands at 141,793 and is increasing by about 2,000 voters a year. The borough includes Swindon itself and several small nearby villages.

Swindon Borough Council pilot

The council was offered a choice of voting suppliers and chose Electoral Reform Services. This company is part of the Electoral Reform Society, which has been involved with UK elections since 1884. It has its own telephone voting system, which was used in Swindon. The Internet voting element of the pilot was contracted out to a US company, VoteHere Inc. This company has been involved in many US online elections, both public and private.

Those eligible to vote (126,953 people) received a ballot pack including a sealed polling card. The pack contained details of the various methods of voting and the sealed polling card included a unique ballot code consisting of two sets of numbers, one of six and one of four digits, randomly generated. This ballot code could be used to vote either via the Internet or by telephone during the six day early voting period (6a.m. 25 April to 12a.m. 30 April). If the voters did not vote via either of these methods they could take their ballot card to the polling station and vote in the traditional manner on the national polling day on 2 May. Those who had applied for a postal vote had their ballot code number deactivated prior to the opening of Internet and telephone voting.

The Internet voting process at Swindon

(1) Voters log on to the voting Web site by entering their unique ballot code.
(2) *Screen two.* They are prompted to enter their date of birth. This does not identify individual users and has no effect on the process other than to confirm that voters are aged over 18. It is intended to reassure voters with another level of security and has been found in the past to deter fraudulent voting attempts.
(3) *Screen three.* A facsimile of the ballot paper is then displayed. Voters make their selection by clicking in the appropriate box.
(4) *Screen four.* The details of their date of birth, ward they are voting in and the candidate they are voting for appear on screen. At this stage it is possible to go back to screen three and change the vote if the voter so wishes. If they are satisfied with the details of their vote they click the submit button. After clicking the submit button voters cannot alter or retract their Internet vote.
(5) The vote is encrypted and saved.
(6) *Screen five.* The final screen displays the time and date of voting (though not the candidate voted for) and the voter can print it out if they wish. The voter clicks the log out button and voting is completed.
(7) In the case of the Swindon election, voters were forwarded to a questionnaire after logging out.

At the close of early voting, the ballot codes of all the telephone and Internet voters were received by the council from Electoral Reform Services and the names were marked on the electoral register in order that those voters could not also vote at the polling station.

Methods

The methods used in the research were questionnaires, a psephology study of voter turnout and an interview with the pilot co-coordinator at Swindon, Mr Alan Winchcombe.

The questionnaires

The electronic voting and all postal pilots in 2000 were partly assessed by an exit poll questionnaire and this study used the same method, since it can provide good quantitative data with which to assess the issue. Obviously, an exit poll in an Internet-enabled election presents problems in that it is hard to approach the voters if they are voting remotely. Therefore three online questionnaires were devised, one pre- and the other two post-election. A printed polling station questionnaire was also compiled to gauge opinion among those who used the traditional voting method. The second, third and fourth questionnaires were intended to be completed only by voters and the first (pre-election) questionnaire was available to and promoted as a forum for voters and non-voters alike.

The opinion of non-voters is important in such a study but they are hard to identify and canvass. The restrictions of the research unfortunately did not allow for the collection of non-voter opinion besides that captured in the first questionnaire.

The questionnaires were kept as brief, though as thorough, as possible, so that people would not be put off responding by being asked to complete a long questionnaire. In order to achieve as high a response rate as possible most questions included tickable options but also allowed space for respondents to write in their own answer if appropriate.

The four questionnaires shared many questions in common. These were intended to establish who was voting (age, gender and occupation), how often they vote (local and general elections) and, in the case of questionnaires one and two, where and how often they use the Internet.

Questionnaire one – pre-election survey
The first questionnaire was an online one, it was available from 12 April to 2 May 2002, polling day, and was promoted in the Swindon local press (hard copy and online) and by Swindon Web sites. Its purpose was:

- To gauge opinion about Internet voting before the method had been tried.
- To see where people were getting their information about Internet voting. Was it online or in hardcopy, was it coming from the council, media sources or from political parties?
- To allow a comparison of impressions about security and secrecy between those who had not yet experienced Internet voting and those who had. Obviously it cannot be a direct comparison since the answers are anonymous and it is not possible to be sure that respondents are the same people.

Questionnaire two – Internet voters
The second questionnaire was also an online one, available during the Internet voting period, i.e. from 25-30 April. It was accessible only from the VoteHere Web site. After casting their vote Internet voters were automatically forwarded to the questionnaire Web site and could choose whether to complete the questionnaire or not. This questionnaire was not promoted or advertised anywhere else since it was purely for those who had voted via the Internet. Its purpose was to see:

- Who chose to vote via the Internet (age, gender and occupation), and whether they were regular Internet users and voters.
- How easy a process they found it.
- Whether they were confident in it as a method of casting a vote.
- Whether they would use it in future elections.

Questionnaire three – polling station voters
The third questionnaire was a paper one, distributed to all voters at each polling station on Election Day, along with a prepaid return envelope. Its purpose was to determine:

- Whether these voters were aware of the pilot methods of voting.
- If so, why they chose to vote in the traditional manner.
- Whether they agreed with the need for supplementary voting methods.

Questionnaire four – Internet voters follow-up
This was the follow-up questionnaire for Internet voters who had voluntarily left their e-mail address at the end of questionnaire two. It was devised in the light of those answers and was intended to clarify some of them, in order to:

- Determine whether the option of early voting or of Internet voting was the primary reason for choosing Internet voting.
- Find out where people voted from: home, work or elsewhere.
- Find out if they would be happy to vote from work if given the opportunity.

Psephology study

The psephology study was an examination of voting statistics for Swindon in the 2002 and previous elections to see if turnout had increased. It was also an examination of the political and socio-economic factors that may have influenced turnout.

Interview

Interviews with the co-ordinators of the pilots were a valuable element in the reports of the

2000 pilots, giving the perspective of the organisers on the trials which, along with the voters' views, helped to clarify the feasibility of online voting. After the election an interview with Mr Alan Winchcombe, deputy returning officer and pilot coordinator, was conducted in Swindon. The interview was an informal interview/discussion over the course of five hours and a wide range of topics in relation to the pilot was discussed. It provided insight into the local political situation and to the socio-economic make-up of the various wards.

Results

Questionnaire one – pre-election survey

This had a low response rate; there were only 104 responses. This may have been due to the questionnaire not being promoted on the council Web site, which was being upgraded at the time. The majority of respondents were male (64.4 per cent) and in social classes A, B and C1 (79.7 per cent). They are frequent users of the Internet at home and at work, 52.8 per cent vote at every local election, 33.7 per cent at most local elections and 80.9 per cent vote at every general election.

The majority (67.3 per cent) did intend to vote via the Internet, and of these 72.9 per cent were male and 55.7 per cent were in the 25-44 age group. Most of the information about Internet voting was received in hard copy (70.5 per cent), 48.7 per cent came from the council, while political parties accounted for 7 per cent. The chief source of online information was also the council at 14.8 per cent. The media accounted for a total of 18.3 per cent of information received, 3.5 per cent came from online sources.

The respondents were more confident than not that their Internet vote would remain secret once cast (72.2 per cent), 8.7 per cent expressed a lack of confidence. Confidence that there would be no misuse or alteration of the vote once cast was higher, 76.9 per cent expressed confidence and 2.9 per cent were not confident. Respondents supported the need for supplementary voting methods (88.5 per cent) such as Internet and telephone voting.

Election results

The turnout in the election was 31.23 per cent: 39,650 of the 126,953 people eligible to vote did so. This was an increase of 3.5 per cent from the turnout in 2000 of 27.7 per cent. Table I shows the breakdown of the percentage of votes cast by each method.

The figures in Table I show that Internet voting had a good take-up rate among the electorate as a whole and was twice as popular as telephone voting. Internet take-up in the individual wards varied considerably and will be examined later.

The Internet voters

Response to questionnaire two, the Internet voters' "exit poll", was good: 3,310 voters (77 per cent) completed it. The government had hoped to attract young people with the new voting methods; however, they only accounted for 6.2 per cent of Internet voters and were outnumbered by those aged 60+. Take-up of telephone voting among the young was also disappointing.

The results show that the majority of Internet voters were regular voters, 82.3 per cent vote at all or most local elections. Of the remaining 17.7 per cent, 4.7 per cent were first-time voters. The age distribution of first-time voters (Table II) indicates that most (64.1 per cent) are too old to be first-time voters due to age. Other explanations might be that some are foreign nationals voting for the first time or that these voters were motivated to vote for the first time because of the Internet voting option. However, it is impossible to be certain of the reasoning.

When asked if the option to vote via the Internet had influenced their decision to vote in the 2002 election, 24 per cent said it had

Table I Vote share of each voting method

Voting method	Votes cast	% of total
Telephone	2,028	5.11
Internet	4,293	10.83
Postal	4,416	11.14
Polling station	28,913	72.92
Total	39,650	100

Table II Age distribution of first time voters (Internet only)

Age	Count	%
18-24	56	35.9
25-44	76	48.7
45-59	20	12.8
60+	4	2.6
Total	156	100

influenced their decision while the remaining 76 per cent said they had been somewhat influenced. This contradicts the regularity of voting figures since the regular voters (82.3 per cent) would presumably have voted anyway and so would be expected to have answered no to this question.

The majority of Internet voters found the process straightforward – 94.5 per cent rated the system as very easy to use. However, several voters commented that their preferred browser was not compatible with the system, a problem overcome by rebooting and using a Microsoft browser. Apple Mac users had a similar problem. One blind woman found the site hard to navigate using just her keyboard. The majority of comments were positive about the system. Only 0.2 per cent of Internet voters found the process less convenient than going to the polling station. Asked to specify what made it more convenient 1,412 respondents wrote in reasons (shown in Table III).

The primary reason cited for the increased convenience afforded by Internet voting among all Internet voters was that the poll was open over six days. However, among the age groups reasons for the convenience of Internet voting differed. For those aged 25-44 and 45-59 it was being able to choose when to vote over a six-day period, but for the 18-24 year olds it was being able to vote although away from home (many mentioned being away at university). While among those aged 60 and over it was being able to vote without having to leave home/work. Avoidance of the polling station, a category which included having to make a special journey there, the difficulty of parking and not wishing to be pestered by pollsters outside, was in the top three reasons among each age group.

Confidence that the vote would remain secret and would not be misused or altered once cast was high; only 4.9 per cent expressed a lack of confidence about secrecy and 3 per cent were not confident that there would be no misuse or alteration of cast votes. Voters could have stopped the process at any time and voted in the traditional manner, so even though a few were not confident about the process they still chose to use it.

The Internet voters were asked whether they would be happy to use the method in future elections, more were prepared to use it in future local elections (97.2 per cent) than in general elections (92.9 per cent). Those who were undecided or would not use Internet voting in a general election had two main reasons: security concerns; and a lack of occasion afforded by voting remotely. The quotes below may point to some of the explanations for the different attitude:

> Whilst I am confident of no tampering for local elections, who's to say that it wouldn't PAY to do so for general elections? (male 25-44).
>
> E-voting lacks the sense of occasion that sometimes accompanies a general election. (female 60+).

Internet voters follow-up questionnaire

The follow-up questionnaire was used to clarify a few issues about Internet voting; such as whether voters had chosen to use it because it was possible to vote over six days or because of the method itself, where they had voted from and whether they would be happy to do so from work. Of the 985 voters who left their e-mail address, 100 addresses proved to be invalid and 470 voters replied to the online questionnaire, a response rate of 53.1 per cent. Most Internet voters (50.5 per cent) cited the opportunity to vote via the Internet as their primary reason for using the method,

Table III Reasons for Internet voting convenience

Reason	Count	% of total ($n=3,310$)	Valid % ($n=1,412$)
Poll open over six days	272	2.39	19.26
No leaving home/work	244	2.14	17.28
Avoid polling station	230	2.02	16.29
Timesaver	155	1.36	10.98
Work long hours	134	1.18	9.49
Away from home	124	1.09	8.78
Dependants at home	77	0.68	5.45
Using Internet anyway	70	0.61	4.96
Disabled/ill	45	0.39	3.19
Effortless/simple	40	0.35	2.83
Novelty	21	0.18	1.49

only 14.3 per cent chose it because it allowed them to vote early, the remaining 35.2 per cent said both were of equal importance. So, although being able to vote over six days made the process more convenient for the majority of voters it was not their primary motivation for using this method to vote.

Most voters voted from home (81.7 per cent) and did so because it offered greater convenience. This supports the criticism that remote Internet voting disadvantages the 55 per cent of the population without access to the Internet and favours those in classes A, B and C1. Almost 50 per cent of voters would be happy to vote from work and so, if employers were to provide the facilities or allow the employees to use their work PCs for voting, it might address the imbalance.

However, 50.2 per cent are not happy to vote from work or do not have a workplace, and privacy is an issue for almost half of this group. Greater promotion of the use of Internet facilities in libraries or Internet cafes/kiosks for voting might be considered, although this would still disadvantage cafe/kiosk users somewhat because they would have to pay for access. Also, there is a privacy issue since most Internet facilities in libraries and cafes are open plan and the choice of a voter's candidate might be visible to others.

The voter profiles

The profile of the polling station voter was markedly different to that of the Internet voter (Table IV). Polling station voters are older and more are female, they also vote more frequently, though both groups have a high participation rate. The Internet voters are younger and more likely to be male; most are in social classes A, B and C1.

The polling station voters

The questionnaire had a 39.44 per cent response rate, 11,404 of the 28,913 polling station voters completed it. The results show that while the voters were aware of the option to vote via the Internet they did not choose to use it because, among other reasons, they just prefer to use the polling station (47 per cent), have no Internet access (29.2 per cent), or just find it more convenient to use a polling station (20.2 per cent).

Attitudes towards Internet voting were demarcated along age lines. Among all age groups those aged 60+ composed the largest group who preferred to vote at the polling station (50.8 per cent), found the polling station more convenient (40.55 per cent) and had the lowest rate of Internet access (62.93 per cent). They were also the group most daunted by the technology (58.10 per cent), although only 2.5 per cent of all respondents ticked this reason for not voting via the Internet. Some polling station voters, 9.1 per cent of all respondents, said that they had intended to vote via the Internet but had variously forgotten to vote via the Internet, had missed or were unaware of the deadline. Of this group almost half (49.31 per cent) were aged 25-44 and 36 per cent were aged 45-59.

The majority of polling station voters (60.7 per cent) did agree that there was a need for supplementary voting methods, however the 60+ age group was least in favour, 46 per cent of that age group agreed and 39 per cent disagreed. Comments in favour of supplementary voting methods such as Internet and telephone voting included that they would be helpful for the disabled and ill, also that they might encourage more people to vote. Those undecided or against supplementary methods disagreed and were of the opinion that apathy is the cause of a low turnout and new voting methods cannot address this problem. Security concerns were also an issue among those disagreeing with the need for supplementary voting methods.

Table IV Voter profiles

Characteristic		Internet voters (%)		Polling station voters (%)
Largest single age group	25-44	48.0	60+	42.6
Social classes A, B and C1		69.2		52.2
Female/male		43.3/56.7		52.3/47.7
Vote at all or most local elections		82.3		94.6
Vote at all or most general elections		91.5		98.0
First time voter		4.7		1.4

A secure voting method?

There were no reported incidents of security breaches during the period of Internet voting although VoteHere personnel were monitoring the site and did observe several unsuccessful attempts to hack into it. Multiple votes from single IP addresses were also checked and found to be legitimate votes cast over Swindon companies' systems. The council had encouraged local businesses to provide facilities for Internet voting in the workplace.

There was a case at a polling station of a woman unable to cast a vote because her husband had inadvertently used her ballot code to cast his vote via the Internet. She was marked on the electoral register as having already voted by other means and so was refused a ballot paper at the polling station. Her husband, who was accompanying her, was also refused a ballot paper since he admitted to the polling staff that he had already voted in the election, albeit using his wife's vote. This mistake was possible because the date of birth validation, requested during the logging on process, did not require the voter to enter their actual date of birth, only one that confirmed them to be aged 18 or over.

Internet take-up among the wards

Turnout in the Swindon wards has always varied in each election, and in the 2002 election it varied between 21.78 per cent (Parks) and 52.68 per cent (Old Town and Lawn). The borough average was 31.2 per cent, an increase of 3.5 per cent. All wards had an increase in turnout in 2002 except those that had piloted all-postal voting in 2000. The turnout in these wards had increased considerably with all-postal voting and it is perhaps unsurprising that it was not sustained in this election. The average Internet take-up in Swindon was 10.83 per cent. The wards with the highest Internet take-up, such as Abbey Meads and Shaw and Nine Elms (both almost twice the borough average), are more affluent, owner occupied areas with a younger population. As the MORI figures show, Internet access is likely to be high in such areas (MORI, 2002). Usage is 36 per cent (A, B) and 35 per cent (C1) by class and younger people have greater access; those aged between 25 and 54 account for 67 per cent of all Internet users.

Conversely, Parks and Penhill are socially deprived and had both a low turnout and a low Internet take-up rate. Parks was in fact the lowest in both categories with a turnout of 21.78 per cent and an Internet take-up rate of 5.74 per cent. Access and usage amongst C2 (18 per cent) and D, E (12 per cent) is the lowest of all social classes. The ward with the highest turnout was Old Town and Lawn. This population is affluent but is mainly composed of retired people. This group tends to vote regularly but generally has low rates of Internet use and access (4 per cent among those aged 65 or more). Internet voting only accounted for 10.96 per cent of votes cast in this ward, similar to the borough average.

A political explanation for the increased turnout?

The political situation in Swindon may account for the increase in turnout. Swindon Borough Council had been Labour controlled from 1973 to 2000 when the party lost control and no other party won overall control. During Labour's 27-year tenure turnout, as in the country as a whole, steadily declined, Labour councillors held most of the seats and held most with a high majority. As a Department of Employment, Transport and the Regions study found, turnout is generally lower when one party is in control of the council and turnout declines further when that party has a large majority of the vote (DETR, 2000). However, when control of the council is "up for grabs", as in Swindon in 2002, party workers put greater effort into mobilising their supporters out to vote and an increase in turnout may result.

Conclusions

Is remote Internet voting feasible?

The Internet pilot worked well overall. There were some accessibility issues relating to browser incompatibility and, more seriously, a visually impaired woman found navigating the voting Web site via her keyboard was difficult. The system is not foolproof as the voter who used his wife's vote found. Nevertheless, most Internet voters found the system easy to use and were confident that their vote would remain secret and would not be misused or altered once cast.

The Electoral Commission states in its executive summary report of the pilots (Electoral Commission, 2002) that:

> The benchmark against which innovative pilot schemes should be tested is not a 100 per cent secure system. There are security and other weaknesses inherent in traditional polling station voting. The key issues here relate to voter confidence. The traditional system of voting by pencil and paper at polling stations has a very high degree of voter confidence, despite its inherent flaws.

By this measure, Internet voting is currently feasible, confidence that it offered a secure way to cast a vote was high amongst users. However, that confidence was based upon ignorance of the true nature of the security features. A more secure means of validating the legitimacy of remote Internet voters needs to be developed before it is used on a wider scale. However, if infrequent voters are not to be discouraged from using the method, any means of voter validation has to be as simple and convenient as possible, which rules out pre-registration, for example.

Is Internet voting attractive to voters?

Those who cast their vote via the Internet were satisfied with the process. They found it easy to use and considered that it offered great convenience, most voted from home. They also expressed a willingness to use it in future local elections, though a slightly smaller number would use it in general elections. Those who had reservations about using it for general elections mostly said that they would prefer to vote at a polling station because general elections have a sense of occasion lacking in local elections. Some respondents suggested that Internet-enabled general elections might be a more attractive target for attempts at fraud or disruption than would local elections. Internet voting is not attractive to all voters and there is evidence of a digital divide. Those who chose the polling station did so because they prefer it or because they have no Internet access, while one-fifth claimed using polling stations was more convenient. The government's intention to attract the under 25s out to vote with Internet voting was not realised. They also failed to use the telephone voting option in any great numbers.

It can be concluded that Internet voting is predominantly attractive to a certain type of voter: affluent younger males who regularly vote and who use the Internet frequently. However, as Gibson *et al.* (2002) observe, newer Internet users are increasingly less likely to be male and in classes A and B (Gibson, 2002). It is to be hoped that as Internet take-up increases, future Internet voting will appeal to a broader range of users.

Did Internet voting increase turnout by attracting new voters?

The turnout in 2002 did increase but it is inconclusive as to whether the increase of 3.5 per cent was due to the Internet option being available. All wards, except those that had piloted all-postal voting in 2000, experienced an increase in turnout and in some wards it was a substantial increase. Only one ward, Shaw and Nine Elms, had an increase in turnout (2.4 per cent) of less than the borough average; it also had the second highest Internet take-up of any ward.

The results, however, indicate that most of those choosing to vote via the Internet were regular voters already. Only 17.7 per cent were infrequent or first-time voters. It is impossible to determine how many of the first-time voters (4.7 per cent) were encouraged to vote for the first time solely because of the Internet option. The percentage of votes cast online was 10.83 per cent borough wide, though it varied in the wards from a high of 20.84 per cent to a low of 5.74 per cent. The variance illustrates that, as discussed above, Internet voting is attractive to only certain sections of the electorate. Telephone voting was only half as popular as Internet voting; only 5.11 per cent of voters used it. The variance among wards of telephone use supports the theory that Internet voting is only attractive to a certain section of the population since there was a much smaller variance in take-up of telephone voting (by ward the highest take-up was 6.08 per cent and the lowest was 4.03 per cent), which indicates a more uniform take-up, albeit in smaller numbers.

It is impossible to say with any certainty that the option to vote via the Internet resulted in the increased turnout in Swindon. Firm conclusions cannot realistically be drawn from one study. The 2003 pilots, which Swindon will be taking part in, will provide more data with which to assess the question of whether remote Internet voting can increase, or help to increase, turnout. This study does indicate that merely changing how people vote cannot solve the question of voter apathy and a low turnout. As Diplock found, the inconvenience of the voting process is only a minor consideration for non-voters. Their primary concerns are that:

- their vote will make little difference to the outcome, the parties are too homogenised;
- there is no alternative to the main parties, none of which appeal to them; and
- they have a lack of knowledge to make an informed choice about whom to vote for.

Addressing these issues, for example through more political education and greater interaction between politicians and the public at all times, rather than just in the run-up to an election, might encourage more people to vote. Providing more convenient voting methods is only part of the solution to the problem of a low turnout.

Notes

1 The DTLR has since been divided into three separate departments: electoral reform issues are now the responsibility of the Lord Chancellor's Department (www.lcd.gov.uk).

2 A US non-partisan, non-profit, voters' rights organisation.

References

California Internet Voting Task Force (2000), *A Report on the Feasibility of Internet Voting*, available at: www.ss.ca.gov/excutive.ivote/ (accessed April 2003).

DETR (2000), *Turnout at Local Elections*, available at: www.elections.dtlr.gov.uk/turnout/02.htm

Diplock, S. (2001), *None of the Above. Non-voters and 2001 Election*, Hansard Society, available at: www.hansard-society.org/NoneoftheAbove.htm (accessed April 2003).

DTLR (2001), *Modernising Democracy. Prospectus for Electoral Pilots – Local Elections 2002*, available at: www.elections.dtlr.gov.uk/modemoc/ (accessed April 2003).

Electoral Commission (2002), *Modernising Elections: The Pilots Programme*, available at: www.electoralcommission.gov.uk/elections/may2002.cfm (accessed April 2003).

Gibson, R., Lusoli, W. and Ward, S. (2002), *UK Political Participation Online – The Public Response. A Survey of Citizens' Political Activity via the Internet*, available at: www.ipop.org.uk (accessed April 2003).

Mohen, J. and Glidden, J. (2001), "The case for Internet voting", *Communications of the ACM*, Vol. 44 No. 1, pp. 72-85.

Mori polls (2002), *Internet Access Statistics*, available at: www.mori.com/emori/tracker.shtml (accessed May 2003).

Phillips, D.M. and Jefferson, D. (2000), "Is Internet voting safe?", *VIP Reports*, available at: www.voting-integrity.org/text/2000/internetsafe.shtml (accessed March 2002).

The British Life and Internet Project: inaugural survey findings

Barrie Gunter, Chris Russell, Richard Withey and David Nicholas

The authors

Barrie Gunter is Professor of Journalism Studies, Department of Journalism, University of Sheffield, Sheffield, UK. **Chris Russell** is Director, eDigitalResearch.com, Hedge End, UK. **Richard Withey** is Global Media Director, Interactive Media, Independent News & Media, London, UK. **David Nicholas** is Professor of Information Science, Department of Information Science, City University, London, UK.

Keywords

Internet, Consumer behaviour, Interpersonal communications, United Kingdom

Abstract

The British Life and Internet Project was launched in 2002 to explore the way people use the Internet in Britain. It will survey people online throughout each year on a range of topics linked to the use of the Internet. In the first survey that was conducted, just before Christmas 2002, respondents were asked a series of questions about their history of involvement with the Internet and the nature of their online behaviour. The findings indicated that online technology was used overwhelmingly for sending and receiving e-mails and for obtaining news and information linked to work and hobbies. Such is the demand of the Internet on the time of users that many acknowledged reducing the amount of time they spend on other activities, such as watching television, reading newspapers, and even going out to do the shopping. The Internet is, for most of its users, an important interpersonal communications medium, used to stay in touch and gossip with family and friends.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 4 · 2003 · pp. 203-216
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310486566

Introduction

The Internet is one of the fastest growing communications phenomena ever, with dramatic increases in online activity observed over the closing years of the twentieth century. While the telephone took 75 years to reach 50m users world-wide, and television took 13 years, the Internet took only four years (UNDP, 1999). NUA figures for May 2002 showed more than 580m Internet users in the world, with the greatest concentrations being found in Europe (186m), North America (183m) and the Asia/Pacific region (168m). NUA is a company that monitors surveys by a large number of market research companies in different countries (Norris, 2001). Although the use of different surveys limits the comparability of the data, these estimates have been confirmed by other sources world-wide, including government departments, media organisations and interest groups (Arunachalam, 1999).

There are wide disparities between nations in the degree to which significant Internet penetration has been achieved. This "digital divide" has been linked to economic, political, social and cultural factors and has been found to occur within nations as well as between them (Norris, 2001). While the uptake of new communications technologies has displayed regional and socio-economic variations, the Internet has, nonetheless, emerged as a significant new medium through which individuals obtain information and entertainment, and conduct a range of transactions.

Research among the online populations of the USA and Europe has revealed that, while many people search for information on the World Wide Web, the most popular application of the Internet is to send e-mails to family and friends (Pew, 2000; Eurobarometer, 2000). By 2000, nearly seven in ten (69 per cent) Internet users across Europe had e-mailed family, friends or colleagues in the last three months, while approaching one in two said they had searched for educational materials (47 per cent) or product information (47 per cent). Around one in seven said they had purchased items such as books (14 per cent) or CDs (14

Received 11 March 2003
Accepted 21 March 2003

per cent) online. Other uses included searching for job-related information, listening to music online, visiting government Web sites, watching TV channels and bidding in auctions. All this activity illustrates the range of applications that characterise Internet behaviour.

While much publicity has centred on the role the Internet can play in relation to business and consumerism, for many of its users its application is focused much closer to home. For the great majority of Internet users, being online is important because it provides a convenient, on-tap access route to family and friends. In the USA, the most advanced Internet nation in the world, most Internet users acknowledge that e-mail has improved their contacts with family and friends. The guilt over not having made the effort to see a relative or friend for a long time could be appeased by sending them an e-mail. In fact e-mail was more convenient than having to take time out to visit. Through the Internet, contact with friends could be maintained without having to spend so much time talking to them. Further, it was easier to have unpleasant conversations or to speak one's mind via e-mail and such messages could clear the air when relationships were strained (Pew, 2000).

Other research has confirmed these survey reports about the nature of interpersonal relations online. Within a computer-mediated environment, the relative anonymity and emotional distance it creates can cause people to communicate with each other differently than from face-to-face meetings. We may all display greater bluntness of expression online and more honesty in the way we disclose our feelings (Joinson, 2001; Joinson and Banyard, 2002; Postmes *et al.*, 2002).

As users become more experienced online, the Internet can become transformed into a purposeful tool with a range of applications (Pew, 2002a). From initially learning how to use e-mail to send messages to people we know, as user competence grows, the Internet is used for more complex applications including work-related tasks, to make purchases and to conduct financial transactions. It can be used to find information about a wide range of topics, either to satisfy idle curiosity or for more specific reasons. US research has indicated that the Internet can play crucial information-providing and advisory roles in relation to a number of major life events. Users indicated that they used the Internet in relation to education and training for their career, getting a new job, obtaining information to help a loved one who was seriously ill, choosing the best available school for their children, and for making significant purchases such as a car (Pew, 2002b).

In addition to the functions it can serve for individual users, the Internet has been promoted as enhancing democracy by making governments more accessible to citizens, providing transparent information about government activities and making those who govern more accountable. In Britain, the Government has set the ambitious target of ensuring that virtually all government departments – central and local – are online by 2005. Government Web sites will not simply provide information about government policies and activities, but will function as transactional links through which citizens can engage directly with a wide range of public services (Office of the E-envoy, 2001). As yet, while there has been significant growth in government Web sites, internationally, sophisticated interactive communications links and transactional services have been limited (Norris, 2001). Nonetheless, evidence has emerged that significant minorities of citizens have begun to use government and party political Web sites (Eurobarometer, 2000).

This paper reports initial findings from a new research project that has been designed to track the behaviour and opinions of Internet users in Britain. The British Life and Internet Project (BLIP) was launched in 2002 to explore the way people use the Internet in Britain. Surveys are conducted online with known Internet users around the country[1]. The survey has access to some 30,000 UK e-mail addresses that have been compiled from a number of Internet user databases.

Periodically, online questionnaires are posted on the BLIP Web site (www.britishlifeproject.co.uk) or e-mailed to members and Internet users invited to respond. Each survey collects information about the demographic characteristics of the sample and respondents' Internet using history. In addition, surveys focus on specific themes that are concerned with the way people use the Internet, what they use it for, their opinions about Internet services and its impact on their lives.

The current survey, which served to launch the project, focused on the way people use the Internet around Christmas time. It investigated the way people use the Internet at this special time of year to keep in touch with family and friends and to seek out and purchase Christmas gifts. How much do Internet users now depend on cyberspace for their Christmas shopping? How much do they spend? Do they have any reservations or concerns about shopping on the Internet? How significant has the Internet become, alongside or in place of more traditional forms of Christmas-time communication, in enabling people to keep in touch with their loved ones?

The Christmas Internet survey

The fieldwork was conducted between 2-10 December 2002. In all, 12,400 Internet users were contacted about the survey and 2,887 responded (giving a 23 per cent response rate). The initial survey was sent to a database of users provided by The Independent Digital Group.

Demographic profile

The response sample comprised nearly two-thirds male respondents (64 per cent) and over one-third female respondents (36 per cent). The sample exhibited a diverse age spread: 18-24 (14 per cent), 25-34 (25 per cent), 35-44 (24 per cent), 45-54 (21 per cent), 55-64 (11 per cent), and 65+ (5 per cent).

More than two-thirds of respondents were in full-time work (69 per cent), with under one in ten, respectively, in part-time employment (9 per cent) or unemployed (9 per cent). Just over one in ten (11 per cent) reported that they were in full-time education.

One in three respondents were single (33 per cent), more than four in ten (43 per cent) were married, and one in six (16 per cent) were living with a partner to whom they were not married. A small minority (8 per cent) were divorced, separated or widowed.

A clear majority of respondents (75 per cent) had no children up to age 16 living with them in their household, one in eight (12 per cent) had one such child, and one in seven (14 per cent) had two or more children living at home.

An overwhelming majority of respondents (92 per cent) were white and of European origin. The remainder were divided among Indian/Pakistani/Bangladeshi (2 per cent), Arab (1 per cent), Chinese (1 per cent), other Asian (1 per cent), Caribbean (1 per cent) and African (1 per cent) respondents.

Newspaper readership

Turning to daily newspaper readership, respondents were asked which daily or evening newspapers they personally read regularly (meaning at least two copies a week). The most commonly reported daily newspaper read by respondents was *The Independent* (26 per cent), followed by *The Guardian* (21 per cent). This is explained by the fact that the survey universe was constructed significantly from an e-mail database supplied by the Independent Newspaper Group. The next most popularly read daily newspapers were *The Times* (10 per cent) and *The Daily Telegraph* (7 per cent). Mid-range tabloid readers of newspapers such as the *Daily Mail* (3 per cent) and *Daily Express* (1 per cent) were much less commonplace among the sample, with *Financial Times* readers (4 per cent) being more frequently occurring. Readers of tabloids such as *The Sun* (2 per cent), *The Mirror* (2 per cent) and *Daily Star* (less than 0.5 per cent) indicate the broadsheet bias in the sample.

This pattern was reflected in claimed Sunday newspaper reading, for which regular reading meant at least two copies a month. The most read newspapers among this sample were *The Observer* (21 per cent), *Independent on Sunday* (21 per cent), *The Sunday Times* (17 per cent) and *The Sunday Telegraph* (7 per cent). These were followed by *The Mail on Sunday* (4 per cent), *News of the World* (3 per cent), *Sunday Mirror* (2 per cent), *Sunday Express* (1 per cent) and then *The People, Star on Sunday* all achieving fewer than 1 per cent of respondents saying they were regular readers.

Internet history

The overwhelming majority of respondents (91 per cent) had Internet access at home, with under one in ten being wholly dependent on gaining access elsewhere (9 per cent). Male respondents (94 per cent) were somewhat more likely than female respondents (87 per cent) to say that they had Internet access at home. Well over half of respondents (58 per cent) indicated that they had had Internet access at home for at least three years. More than one in four (27 per cent) said they had had home Internet access for between one and three years.

Male respondents (63 per cent) were more likely than female respondents (49 per cent) to report home Internet access for three or more years. There was an age difference in reported length of access to the Internet at home. The under-34s (42 per cent) were less likely than those aged 35 and over (69 per cent) to claim to have had home access to the Internet for 3+ years. Married respondents (68 per cent) were far more likely than either cohabiting respondents (53 per cent) or single respondents (44 per cent) to say they had had home Internet access for three or more years.

Most respondents were regular users of the Internet. Nearly four in ten (39 per cent) of those with home access said they used the Internet from home at least twice a day, with more than one in five (22 per cent) saying they used the Internet at home at least once a day. More than one in four of these respondents (27 per cent) claimed to access the Internet from home at least once a week. Male respondents were somewhat more regular Internet users than female respondents. More than four in ten males (43 per cent) reported using the Internet from home two or more times a day, compared with just under one in three females (32 per cent). The heaviest users of the Internet at home were the oldest respondents. Those aged 18 to 34 (23 per cent) claimed to use the Internet from home two or more times a day compared with 43 per cent of those aged 35-54 and 64 per cent of those aged 55+.

More than two-thirds of respondents (68 per cent) said they accessed the Internet from work at least once a day, with a further one in ten (10 per cent) saying they did this at least once a week. Around one in six respondents (18 per cent) said they never accessed the Internet from work.

No gender differences emerged in frequency of Internet access from work. It was not surprising, though, that the oldest age groups were most likely to say they never used the Internet at work. The over-65s (78 per cent) were most likely to say this, followed by a much smaller proportion of 55-64s (39 per cent) and an even smaller proportion of under-55s (11 per cent). Hence, the age-related pattern of Internet use was clear. Older respondents used the Internet predominantly from home, whereas younger respondents, who were still in employment, did so mostly from their place of work. Marital status also exhibited a link to work use of the Internet. Married respondents (22 per cent) were more likely than single respondents (12 per cent) or cohabiting respondents (8 per cent) to say they had never used the Internet at work.

During completion of the online survey questionnaire itself, more than one in two respondents (53 per cent) said they did so from home, with more than four in ten (43 per cent) reportedly doing so from work, and a tiny minority (3 per cent) doing so from an Internet café or from a friend's home.

General Internet-related activities

Respondents were questioned about general Internet-related activities. A list of 37 activities was provided and in each case respondents had to indicate whether they had done any of these things on the Internet in the past week, in the past month, in the past year, or whether they had never done these things online.

The activities most often endorsed as having been engaged in online during the previous week were:

- sending/reading e-mail (99 per cent);
- getting news online (89 per cent);
- doing job-related work (69 per cent);
- looking for information linked to a hobby/interest (65 per cent);
- looking for product-related information such as about books, toys, music (62 per cent);
- going online just for fun or to pass time (59 per cent);
- conducting personal banking online (49 per cent);
- checking weather forecasts (39 per cent);
- getting travel information about airline/hotel prices (34 per cent);
- checking sports scores (31 per cent);
- visiting central government Web sites (30 per cent); and
- getting ideas for gifts to buy for Christmas for family/friends (27 per cent).

Some age-related differences in the nature of use of the Internet emerged. The under 34s (84 per cent) were more likely than either the

35-54s (69 per cent) or the over 55s (49 per cent) to have ever visited a Web site associated with a television programme. While an overwhelming majority of under 55s (94 per cent) said they had, at some time, engaged in work-related activities online; fewer 55-64s (76 per cent) said this, while far fewer respondents aged over 65 (47 per cent) had reportedly ever done this. Instant messaging online was an activity most often associated with those aged 24 and under (70 per cent of whom had ever done this) and least often associated with the over 55s (46 per cent). Yet there were no significant age differences in the extent to which respondents claimed to have sent online Christmas or birthday greetings to family members. The most likely users of adult Web sites were respondents aged 35-44 years. This was the only age group for which the majority of respondents (53 per cent) claimed ever to have visited one of these sites.

Single respondents (50 per cent) and cohabiting respondents (45 per cent) were much more likely than married respondents (30 per cent) to say they had ever taken part in chat rooms online. Single respondents (61 per cent) were also more likely than both married (42 per cent) and cohabiting respondents (51 per cent) to have ever sent instant messages to someone online at the same time. Despite the social usage of the Internet, only a minority overall used it to find a date. This use of the Internet was more prevalent among single respondents (18 per cent) than among married respondents (3 per cent), though cohabiting respondents were markedly more likely than their married counterparts to report having sought an online date (11 per cent).

Purchasing via the Internet

There were signs that Internet users are using the Internet not only to get ideas about things to buy for themselves or for others, but also to make those actual purchases. For instance, eight in ten respondents (80 per cent) had purchased a book online within the past year, with more than one in five (21 per cent) saying they had done so within the previous week.

Again, eight in ten respondents (80 per cent) said that they had bought or made a reservation for travel online within the past year, with one in six (16 per cent) claiming to have done so within the previous week.

More than one in two respondents (51 per cent) said they had made online purchases of groceries or household items over the past year, with nine per cent reportedly having done this within the past week.

Interpersonal communication and the Internet

The Internet was also used as a communications medium for keeping in touch with others, whether relatives, friends or strangers. More than one in ten respondents (11 per cent) claimed to have used the Internet within the past year to find someone to date. Nearly one in four (24 per cent) said they had used the Internet within the past year to meet new people and make new friends. A total of four in ten (40 per cent) had, within the past year, taken part in "chat rooms" or online discussions with other people. Ethnic minority respondents (53 per cent) were less likely to report joining in chat rooms than were Caucasian respondents (61 per cent). More than one in two (51 per cent) had, within the last year, sent "instant messages" to someone who was online at the same time. Finally, seven in ten respondents had used the Internet at some point within the past year to send online Christmas or birthday greetings to family and friends. And, of course, as already noted above, nearly all respondents (99 per cent+) had used the Internet for e-mail purposes.

Online democracy

The government has announced ambitious plans to establish online access to central and local government universally by 2005. The current research indicates that Internet users in Britain are already making use of such online services. More than nine in ten respondents (91 per cent) claimed to have visited a central government Web site in the past year, with three in ten (30 per cent) claiming to have done so within the previous week. A total of eight in ten respondents (80 per cent) had reportedly visited local government Web sites for information about local public services during the past year, with one in five (20 per cent) saying they had done this in the past week. A smaller proportion, but still over half of respondents (54 per cent), claimed to have visited political party Web sites in the past year, with one in ten (10 per cent) saying they had done this in the past week.

Internet as an information source

The evidence from this survey indicated clearly that the Internet is an important information source for its users. Virtually all respondents (99 per cent) had used the Internet to get news, and a significant majority (87 per cent) had used it for weather reports. More than six in ten respondents (63 per cent) had at some time checked online sports scores and over nine in ten (95 per cent) had accessed online travel information in the past year.

Male respondents (41 per cent) were much more likely than female respondents (12 per cent) to say they had checked sports scores on the Internet during the previous week. Female respondents (54 per cent) were much more likely than males (28 per cent) to say that this was something they never did. In addition, respondents with two or more children at home (40 per cent) were more likely to have checked sports results on the Web in the previous week than were either respondents with just one child at home (30 per cent) or no children at home (29 per cent).

On a more personal front, virtually all respondents (99 per cent) had accessed online information relating to a hobby or interest within the last year, and nearly six in ten (58 per cent) had gone online at some point for housing information.

Underlining the growing importance of the Internet to consumers, most respondents (98 per cent) had, at some point in the previous year, looked for product-related information online. Significantly, and probably linked to the proximity to Christmas, more than six in ten (62 per cent) said they had looked for product-related information online within the past week.

Internet as entertainment

The Internet is not just a source of information, it is also a source of entertainment for its converts. While relatively few respondents (9 per cent) claimed to have watched a movie online, most (77 per cent) had watched video clips online within the past year. Male respondents (24 per cent) were more likely than female respondents (13 per cent) to say they had watched a video clip online during the previous week.

In a hybrid entertainment-related informational application of the Internet, more than seven in ten respondents (72 per cent) said they had visited Web sites linked to TV shows within the previous 12 months.

At the more *risqué* end of usage, nearly one in two respondents (47 per cent) claimed to have visited an adult Web site in the past year. Males (15 per cent) were significantly more likely than females (1 per cent) to say they had visited one of these sites in the past week. Female respondents (83 per cent), meanwhile, were much more likely than male respondents (37 per cent) to say they never visited adult Web sites on the Internet.

Financial usage

Some evidence emerged that many Internet users utilise online financial services. More than seven in ten respondents (71 per cent) said they had conducted personal banking online in the past 12 months, with nearly one in two (49 per cent) having done so within the previous week. Male respondents (53 per cent) were somewhat more likely than female respondents to say they had conducted online banking during the past week. Only a minority (12 per cent) had bought or sold stocks and shares online, however, over the previous year.

Downloading content

The Internet is not just a source of online information and entertainment for live consumption. It provides users with access to content they can download for re-use. More than eight in ten respondents (81 per cent) indicated that they had ever downloaded software online relating to music or digital photography. More than one in five (21 per cent) said they had done this during the previous week. This recent activity was reportedly more prevalent among male respondents (26 per cent) than female respondents (11 per cent).

A clear majority of respondents (64 per cent) also claimed ever to have downloaded other kinds of files such as games, video files or picture files. Far fewer respondents reported ever having downloaded movies (16 per cent) or music recordings (38 per cent), or to have shared files from their own computer such as music, video or picture files, or computer games with others online (30 per cent). Male respondents (34 per cent) were more likely ever to have engaged in file sharing online than were female respondents (22 per cent).

Those activities most often endorsed as never having been done online were:

- watching a movie online (91 per cent);
- finding someone to date (89 per cent);
- playing a lottery or gambling online (89 per cent);
- buying stocks and shares online (88 per cent);
- downloading movies (86 per cent);
- meeting new people or making new friends (76 per cent);
- participating in online auctions (74 per cent);
- getting photos developed/storing/ displaying photos online (72 per cent);
- sharing files from own computer (e.g. music, video, picture files) (70 per cent); and
- obtaining music recordings online (62 per cent).

Internet and use of time

Survey respondents were asked whether using the Internet had changed the amount of time that they spend on a variety of other activities. Had the Internet increased or decreased the amount of time spent on the listed activities? A total of 11 activities were presented in this context: working at the office; working at home; shopping in stores; commuting in traffic; reading newspapers; watching television; spending time with my family; thinking about what to buy people for Christmas; spending time with my friends, and attending social events and activities.

In terms of percentages of respondents saying that using the Internet had decreased the amount of time they spend on each of these activities, the ranking that emerged is as follows:

- watching television (42 per cent);
- reading newspapers (36 per cent);
- going around shops buying Christmas presents (34 per cent);
- shopping in stores (33 per cent);
- commuting in traffic (16 per cent);
- working in the office (13 per cent);
- thinking about what to buy people for Christmas (11 per cent);
- spending time with my family (11 per cent);
- working at home (6 per cent);
- spending time with my friends (5 per cent); and
- attending social events and activities (5 per cent).

Internet use appears, on the basis of this self-report evidence, to have had the greatest impact on watching television and reading newspapers. While the greatest proportion of respondents said that using the Internet had made no difference to time spent watching television (56 per cent) or reading newspapers (50 per cent), as the figures above show, significant minorities of respondents said that this new medium had led them to reduce the amount of time they spend consuming these two longer-established media.

The one major gender difference in relation to the reported impact of using the Internet on other activities emerged in relation to television viewing. Here, male respondents (47 per cent) were more likely than female respondents (33 per cent) to say that using the Internet had decreased the amount of time they watched television.

For most respondents, the Internet made no difference to the amount of time they spent working at the office (73 per cent) or at home (54 per cent). In regard to working at the office, the reported impact of the Internet was fairly evenly divided between those saying it had increased the time they spent at the office (14 per cent) or decreased it (13 per cent). Where a clearer impact was becoming established, however, was in respect of working from home. Here, many more respondents said that use of the Internet had resulted in increased amount of time spent working at home (40 per cent) than decreased time working at home (6 per cent). This finding probably also links with reports that the use of the Internet had decreased (16 per cent) rather than increased (1 per cent) time spent in traffic commuting. Number of children in the household was associated with the extent to which respondents claimed to have increased the amount of time they spend working at home. Respondents with two or more children at home (51 per cent) were more likely than respondents with one child (41 per cent) or no children at home (38 per cent) to say that using the Internet had increased the time they spent working at home.

Respondents aged 25-44 (40 per cent) were most likely to claim that using the Internet had decreased the amount of time they spent going round the shops buying Christmas presents, with the 45 and over age groups (30 per cent) being less likely to admit to this change, and the under 24s (25 per cent) least likely of all age groups to acknowledge this effect of the Internet.

The social impact of the Internet was marginal. Most respondents indicated that using the Internet had not changed the amount of time they spent with their family (86 per cent) or friends (90 per cent) or going to social events (89 per cent).

The use of the Internet at Christmas for shopping and buying presents was in evidence. One in three respondents (33 per cent) said the Internet had decreased the amount of time spent shopping in stores, with few (4 per cent) saying the Internet had increased store shopping time. Reinforcing this last finding, more than one in three respondents (34 per cent) also said that using the Internet had decreased (compared with 2 per cent saying increased) time spent going around shops buying Christmas presents. Opinions were more mixed on whether the Internet saved time thinking about what to buy people for Christmas, with 11 per cent saying it decreased time spent doing this and 13 per cent saying it increased time spent on it.

Importance of e-mail to its users

Over nine in ten respondents (92 per cent) claimed to have sent at least one e-mail "yesterday" (i.e. the day before they responded to the survey). One in four respondents (25 per cent) claimed to have sent three to five e-mails, one in three (33 per cent) said they had sent between six and 20 e-mails, and one in seven (14 per cent) had reportedly sent 21 or more e-mails the previous day. Respondents aged 24 to 35 (44 per cent) were most likely to have sent 11 or more e-mails during the previous day, with the youngest (18-24: 15 per cent) and oldest (65+: 11 per cent) being the least likely to have sent this many.

When asked how much they would miss using e-mail if it was no longer available to them, three out of four respondents (76 per cent) said they would miss it "a lot". Most of the remaining respondents (17 per cent) said they would miss e-mail "quite a bit".

Reporting on their behaviour over the past week, most respondents said they had e-mailed a friend (88 per cent) or a relative (60 per cent). This was comparable with telephoning a friend or relative (82 per cent), or visiting with friends (73 per cent), but compared favourably with visiting with family (50 per cent), having friends over to my home (46 per cent), and having family over to my home (28 per cent). The oldest respondents were most likely to have e-mailed a member of their family in the past week. A clear majority of over 55s (77 per cent) said they e-mailed a relative in the previous week, with younger age groups (56 per cent) being much less likely to have done so.

Most respondents said they found e-mail either "very useful" (42 per cent) or "quite useful" (31 per cent) for communicating with members of their family. Even more found e-mail "very useful" (67 per cent) for keeping in touch with friends, with many others (26 per cent) finding it "quite useful" for this purpose. Older respondents aged 55+ (57 per cent) were more likely than younger respondents (under 55: 38 per cent) to say they found e-mail "very useful" for communicating with family members. For the youngest respondents, aged up to 35 (77 per cent), e-mail was "very useful" for communicating with friends, with older respondents (61 per cent) being somewhat less likely to say this.

E-mailing family

Respondents were asked to indicate which member of their immediate or extended family they e-mail most often. Just over one in ten (11 per cent) claimed never to e-mail family members. Among the remainder of the sample, the family members e-mailed most often were ranked as follows:

- sister (15 per cent);
- brother (13 per cent);
- wife (9 per cent);
- mother (9 per cent);
- daughter (8 per cent);
- father (7 per cent);
- son (7 per cent);
- husband (5 per cent);
- cousin (5 per cent);
- niece/nephew (2 per cent);
- in-law (2 per cent);
- aunt/uncle (2 per cent);
- grandchild (less than 1 per cent); and
- grandparent (less than 1 per cent).

E-mailing was found to occur most often between siblings (28 per cent), followed by with parents (16 per cent), and then with children (15 per cent) or between spouses (15 per cent).

When respondents were asked to provide further information about the person e-mailed most often in terms of where they lived, it became clear that this person tended to live at a location remote from the respondents. In nearly four in ten cases, this person lived in a different part of the country (39 per cent) and in more than one in four cases (26 per cent) overseas in a different country. It is interesting to note, nonetheless, that in nearly one in five cases (19 per cent) the family member e-mailed most often lived in the respondent's home, and in a similar proportion of cases (17 per cent) they lived in the same community or area.

The Internet may provide a substitute for face-to-face contact with the family member e-mailed most often. For most respondents (57 per cent) they reported actually seeing this person just a few times a year or less often. At the other extreme, there are family members with whom regular face-to-face contact does not diminish e-mailing them too. In nearly one in five cases, respondents saw the family member they e-mailed most often every day. Significantly, the family member most often e-mailed may also be contacted by telephone fairly frequently too. In more than one in two cases (52 per cent), this person was reportedly telephoned at least once a week.

Getting respondents to think further about the relative they most often e-mailed, they were also asked to indicate the kinds of things they e-mailed this person about in the past four weeks. Ten different reasons for e-mailing were provided. These are shown below in rank order according to how often they were selected by respondents. The relative most often e-mailed was contacted online in the past four weeks:

- to pass along something interesting you heard or read (76 per cent);
- to pass along some news about yourself, family or people you know (73 per cent);
- to pass along a joke or something funny you've heard (58 per cent);
- to pass along something about your job/other things involved with (53 per cent);
- about getting together for dinner or social activity (40 per cent);
- to get advice about something (38 per cent);
- to make arrangements for Christmas (35 per cent);
- to tell them about something that has upset or worried you (32 per cent);
- to find out what they want as a present for Christmas (25 per cent); and
- to wish them a merry Christmas (8 per cent).

Thus, e-mail is used primarily to pass along and share information with family, either about self, family matters or other things of mutual interest. It is still significant, however, that more than one in three respondents used e-mail to make arrangements for Christmas and one in four used it to find out what the other person might want as a Christmas gift.

Some gender-related patterns of use emerged in relation to the Internet as a social activity. Female respondents were more likely than male respondents to say they e-mailed a family member in the past four weeks to pass along a joke or something funny they had heard (66 per cent versus 54 per cent), to tell them about something that had upset them (40 per cent versus 27 per cent), and to pass along something about their job or other things they had been involved in (59 per cent versus 50 per cent).

The youngest respondents, aged up to 35 (64 per cent), were most likely to have used e-mail in the past month to pass along a joke or funny story. Older age groups (52 per cent) were somewhat less likely to use e-mail for this purpose. The over 55s (14 per cent) were twice as likely as the under 45s (7 per cent) to report using e-mail to wish a relative a merry Christmas.

E-mailing friends

Respondents were asked about e-mailing friends as well as family. When asked which of their friends they e-mailed most often – a friend who lives close by or one who lives far away, more than six in ten (62 per cent) said they e-mailed a geographically remote friend.

In nearly six in ten cases (59 per cent), the friend e-mailed most often lived either in another part of the country (30 per cent) or in a different country (29 per cent). In nearly four in ten cases (39 per cent) the friend lived in the same community or area.

E-mailing a friend was, to some extent, a substitute for seeing them face to face. It was also a partial substitute for telephoning them. In nearly six in ten cases (58 per cent) the respondent saw their friend a few times a year at most. In one in two cases (50 per cent), to one in eight cases did they see this friend (12 per cent) or telephone them (14 per cent) a few times a week or more.

Respondents were also asked to give the most usual reasons for e-mailing this friend. The same ten reasons were provided as for family members. Thus, over the previous four weeks, respondents claimed to have e-mailed their friend:

1. to pass along something interesting they had heard or read (79 per cent);
2. to pass along news about yourself, family or people you know (76 per cent);
3. to pass along a joke or something funny you have heard (66 per cent);
4. to pass along something about your job/other things involved in (62 per cent);
5. about getting together for dinner or social activity (54 per cent);
6. to get advice about something (41 per cent);
7. to tell them about something that has upset or worried you (37 per cent);
8. to arrange to see them over Christmas (23 per cent);
9. to wish them a merry Christmas (13 per cent); and
10. to find out what to buy them for Christmas (9 per cent).

The pattern with e-mailing friends was similar to that for e-mailing family. E-mail is used mostly to pass along information and experiences of mutual interest. A few respondents did refer to using e-mail to make Christmas arrangements with friends, but this form of communication was less popular in this context in relation to friends than in relation to family. As with e-mailing relatives, e-mailing friends exhibited gender-related differences. Female respondents were more likely than male respondents to say they had e-mailed a friend in the past four weeks to tell them about something that had upset or worried them (47 per cent versus 30 per cent) and to pass along some news about themselves, their family or people they knew (85 per cent versus 71 per cent). E-mail is a medium for gossip.

The youngest respondents (18-34s: 67 per cent) were most likely to use e-mail to make social arrangements with friends. This age band was also most likely to have used e-mail to pass along a joke to a friend (44 per cent) or to gossip about work or other events in their lives (67 per cent).

Single respondents (66 per cent) and cohabiting respondents (63 per cent) were more likely to use e-mail for making social arrangements than were married respondents (43 per cent). Single respondents (69 per cent) and cohabiting respondents (65 per cent) were also more likely to have e-mailed a friend in the past four weeks to pass along something about their job or other events in their lives than were married respondents (55 per cent).

The Internet and Christmas shopping

One of the principal themes of this survey was to find out the extent to which the Internet is used these days for Christmas shopping. To what extent do Internet users use it to get ideas for gifts and to make actual purchases?

To begin with the survey obtained some wider background from respondents about Christmas shopping. How many people did they have to buy gifts for? Who were these people? How much money were they likely to spend on buying Christmas gifts?

More than one in three respondents (36 per cent) said they had to buy Christmas gifts for ten or more people. More than four in ten respondents (42 per cent) had to buy gifts for between five and nine people, while just under one in five (19 per cent) had to buy gifts for four or fewer people. Just a few respondents (4 per cent) said they had no one they needed to buy gifts for. Female respondents (45 per cent) were more likely than male respondents (31 per cent) to say they had to buy Christmas gifts for ten or more people. Not surprisingly, respondents with either two or more (46 per cent) children or one child in the home (43 per cent) were more likely than respondents with no children living at home (33 per cent) to say they had to buy Christmas gifts for ten or more people.

When asked which people Christmas gifts would have to be purchased for, respondents answered:

- mother/father (19 per cent);
- other relative (17 per cent);
- friend (16 per cent);
- spouse/partner (15 per cent);
- son/daughter (11 per cent);
- work colleague (6 per cent);
- boyfriend/girlfriend (5 per cent);
- grandparent (4 per cent);
- grandchild (2 per cent); and
- other (5 per cent).

In total, most respondents (62 per cent) expected to spend between £100-500 buying Christmas gifts, with one in seven (15 per cent) expecting to spend more than this, and over one in five (22 per cent) expecting to spend less. For most respondents (62 per cent) the most expensive single gift they expected to buy would cost between £21-100, for one in six (16 per cent) it was likely to cost £100-200, and for a small minority (7 per cent) more than £200. For one in eight (12 per cent) the most expensive gift was expected to cost no more than £20.

Whether or not respondents had children living at home with them made a difference to how much money they expected to spend on Christmas gifts in 2002. Respondents with two or more children at home (70 per cent) or one child at home (67 per cent) were more likely to say they would spend £200 or more on Christmas gifts as were respondents with no children living at home with them (47 per cent).

Male respondents (5 per cent) were two and a half times as likely as female respondents (2 per cent) to say they would spend more than £1,000 in total on buying Christmas gifts this year.

Married respondents (45 per cent) were the most likely to say they expected to spend £300 or more on buying Christmas gifts, with cohabiting respondents (34 per cent) and single respondents (14 per cent) being progressively less likely to say they would spend this amount.

When asked whether they had used the Internet yet this year to find out information or to get ideas about Christmas gifts, more than six in ten respondents (61 per cent) said that they had done so. Among those (39 per cent) who said they had not used the Internet in this way yet, between one in five and one in four (23 per cent) said they expected to do so. Thus, among these Internet users, if they had not yet used the Internet to get Christmas gift ideas (during the first half of December), most (77 per cent) were unlikely to do so.

When respondents were asked whether they had used the Internet to purchase any Christmas gifts this year, nearly six in ten (58 per cent) said they had done so. Among those (42 per cent) who had not done this, most (58 per cent) said that they would do so eventually. Married (63 per cent) and cohabiting respondents (63 per cent) were more likely than single respondents (49 per cent) to say they had used the Internet this year to purchase any Christmas gifts.

Among respondents who had decided not to purchase gifts on the Internet, they were asked to give reasons for not doing so. A total of 11 reasons were provided and respondents were invited to say how important each of these reasons was. In terms of percentages of respondents saying these reasons were "very important", the findings revealed the following:

(1) I want to see the items I purchase (49 per cent);
(2) I feel there are better ways to shop (32 per cent);
(3) don't want to risk using my credit card online (19 per cent);
(4) not interested in shopping online (19 per cent);
(5) concerned about quality of merchandise (18 per cent);
(6) don't have a credit card (9 per cent);
(7) not buying gifts this year (6 per cent);
(8) not comfortable using a computer or going to shopping Web sites (5 per cent);
(9) don't have time to shop online (3 per cent);
(10) tried shopping online and it didn't work (3 per cent); and
(11) don't have easy access to the Internet (2 per cent).

The findings indicate that among those respondents who had not purchased Christmas gifts online and did not intend doing so (17 per cent of total sample), the main reasons given were the need still to see the merchandise and belief that offline shopping was a better way to shop. Female respondents (55 per cent) were somewhat more likely than male respondents (45 per cent) to say they wanted to see the items they purchase. A minority also exhibited some concern about credit card security and quality of the merchandise purchased online.

Respondents (58 per cent) who said they had purchased Christmas gifts online were asked how many such gifts they had bought in this way. One in five (20 per cent) said they had bought just one gift online, one in four (26 per cent) had bought two gifts, over one in three (35 per cent) had purchased between three and five gifts, and nearly one in five (19 per cent) had purchased six or more gifts online. Respondents with two or more children living at home with them (29 per cent) were the most likely to say they had bought six or more gifts online, compared with 23 per cent of respondents with one child at home and 17 per cent of respondents with no children living with them.

Among those respondents who had bought gifts online, more than half (57 per cent) had spent between £21 and £100, just under one in five (18 per cent) had spent £101-200, one in seven (15 per cent) had spent over £200, and one in ten (10 per cent) had spent up to £20. The same respondents were asked to say what kinds of gifts they had purchased online. The key findings were as follows:

- books (26 per cent);
- computer products (8 per cent);
- children's toys (8 per cent);
- clothing (7 per cent);
- hi-fi equipment (6 per cent);
- video games (5 per cent);
- small household appliances (toaster, kettle, blender, etc.) (3 per cent);
- ornaments/*objet d'arts* (3 per cent);
- video camera (3 per cent);
- sports equipment (2 per cent);
- children's games (2 per cent);
- TV set/VCR (2 per cent); and
- various other items – perfume/cosmetics, suitcases, jewellery, handbags, garden plants, garden ornaments, large household appliances (all under 2 per cent).

Respondents with two or more children living at home were most likely to report buying children's toys on the Internet, followed by respondents with one child at home (12 per cent) and respondents with no children living with them (6 per cent). Married respondents (10 per cent) were more likely than either single (5 per cent) or cohabiting respondents (6 per cent) to have bought children's toys on the Internet.

Using the Internet to make these purchases did not cause respondents any discomfort. The great majority (86 per cent) said they were "very comfortable" (34 per cent) or "quite comfortable" (52 per cent) giving their credit card details over the Internet. The over 65s (17 per cent) were significantly less likely than average to say they felt "very comfortable" about giving their credit card details over the Internet.

Finally, all respondents were asked about the different ways in which they might communicate with others this Christmas. A clear majority, in each case, said they would mail letters or Christmas cards to family and friends (84 per cent), phone a family member to talk about Christmas holiday plans and events (82 per cent), and phone a friend to talk about Christmas-related plans (77 per cent). Hence all these Internet-linked respondents expected to use traditional forms of communication to reach out to family and friends at Christmas.

More than half (57 per cent) also said they would send e-mails to family members to talk to them about Christmas events and to make plans, nearly one in two (49 per cent) also said they would send a Christmas card by e-mail. Interestingly, ethnic minority respondents (55 per cent) were proportionately more likely to say they would send a Christmas card by e-mail than were Caucasian respondents (48 per cent). Finally, over four in ten (42 per cent) said they would send an e-mail to someone they had not spoken to for a long time to exchange Christmas greetings. Such findings indicate the growing significance of the Internet at Christmas time as a channel through which people can interact with those they have not seen in ages.

Discussion

The survey of Internet users that has been reported here confirmed earlier research in the USA (Pew, 2002a, b) and in Europe (Eurobarometer, 2000) in showing that e-mail is the most widespread single application of the Internet. But while over two-thirds of Internet users said they had e-mailed family, friends or colleagues in the past three months, in the current survey, virtually all respondents (99 per cent) had used e-mail during the past week. Although the authors of this report cannot claim that the survey sample is fully representative of Internet users in Britain, this finding nonetheless underlines the significance of the Internet as a two-way communications medium.

The prevalence of e-mail use may, of course, be explained in part by the timing of this survey. It is possible that use of the Internet to contact family and friends is especially likely to occur at Christmas time. For example, while Internet use has been associated more with younger people, more than one in ten (11 per cent) respondents aged over 65 years claimed to have sent 11 or more e-mails the previous day. E-mail was used more often than the telephone to contact friends, though less often to contact relatives. In fact the significance of the Internet as a communications medium at Christmas was further underlined by marked age differences, with a larger proportion of over 55s (77 per cent) than of younger age groups (56 per cent) claiming to have e-mailed family members during the previous week.

The current survey indicated a key difference in patterns of Internet use by age. The Internet is not the preserve of young people; many older respondents reported regular and long-term use of this medium. The significant difference between younger and older users was the primary location of online behaviour. For younger ones still at work, the Internet was accessed most often from the office, while for older respondents, it was used most often at home.

As an interpersonal communications medium, the Internet is used first of all to gossip, then to share jokes, and then to make social arrangements. It is also used to get advice or to seek emotional support. More than one in three respondents used e-mail to make arrangements to see family members over Christmas, with nearly one in four using it to make such arrangements with friends.

Another prominent feature of Internet-related behaviour for this online sample was the use of the Net for news information. An overwhelming majority (89 per cent) claimed to have used the Internet over the previous week for that purpose. This finding is not surprising, however, given that the sample was derived from a population of online news subscribers. In fact, the current sample comprised many experienced Internet users, with well over half the respondents claiming to have had Internet access for at least three years. Job-related usage was widespread, but so too was looking for information linked to a hobby or interest, or simply going online for fun or to pass time.

The diversity of Internet-related behaviour was further illustrated by the majority of respondents who went online to look for product-related information, travel information and to conduct financial transactions. This type of use indicates the growing competence and confidence of Internet users in Britain. Most respondents (80 per cent) had purchased a book online in the past year, with the same proportion saying they had made an online travel reservation during that time. In addition, over half (51 per cent) had purchased groceries online.

On current evidence, the Internet is emerging as a Christmas shopping medium. It was clear that many respondents had Christmas gifts to buy for a number of people. The majority of respondents in this survey claimed to have used the Internet to seek Christmas gift ideas and information and to purchase gifts. Furthermore, the great majority of respondents (80 per cent) who said they had purchased Christmas gifts over the Internet had bought more than one item this way. More than four in ten (43 per cent) spent more than £100 on gifts purchased online. All this shows the growing significance of the Internet as a consumer medium. Despite the difficulties experienced by early dot-com operators in the late 1990s, these latest findings offer encouraging signs that the Internet could evolve into an important consumer platform in the future.

Note

1 The British Life and Internet Project comprises a consortium consisting of researchers from the University of Sheffield and City University, eDigital Research and the Independent Newspaper Group.

References

Arunachalam, S. (1999), "Information and knowledge in the age of electronic communication: a developing country perspective", *Journal of Information Science*, Vol. 25 No. 6, pp. 465-76.

Eurobarometer (2000), *Measuring Information Society*, Spring, European Commission, Brussels.

Joinson, A. (2001), "Self-disclosure in computer-mediated communication: the role of self-awareness and visual anonymity", *European Journal of Social Psychology*, Vol. 31 No. 2, pp. 177-92.

Joinson, A. and Banyard, P. (2002), "Psychological aspects of information seeking on the Internet", *Aslib Proceedings*, Vol. 54 No. 2, pp. 95-102.

Norris, P. (2001), *Digital Divide: Civic Engagement, Information Poverty, and the Internet Worldwide*, Cambridge University Press, Cambridge.

Office of the E-envoy (2001), "Getting the UK online", *Ukonline*, available at: www.letsallgeton.gov.uk/html/how_gove_help.htm (accessed 1 March 2002).

Pew (2000), *Tracking Online Life: How Women Use the Internet to Cultivate Relationships with Family and Friends*, Pew Internet and American Life Project, Washington, DC, available at: www.pewinternet.org, (accessed 10 October 2002).

Pew (2002a), *Getting Serious Online*, March, Pew Internet and American Life Project, Washington, DC, available at: www.pewinternet.org (accessed 10 October 2002).

Pew (2002b), *Major Life Moments*, January, Pew Internet and American Life Project, Washington, DC, available at: www.pewinternet.org (accessed 10 October 2002).

Postmes, T., Spears, R. and Lea, M. (2002), "The formation of group norms in computer-mediated communication", *Human Communication Research*, Vol. 26 No. 3, pp. 341-71.

UNDP (1999), *Human Development Report 1999*, UNDP/Oxford University Press, New York, NY.

On open source IR

Andrew MacFarlane

The author

Andrew MacFarlane is a Lecturer, Centre for Interactive Systems Research, City University, London, UK.

Keywords

Information retrieval, Open systems,
Software engineering, Worldwide web

Abstract

Open source software development is becoming increasingly popular as a way of producing software, due to a number of factors. It is argued in this paper that these factors may have a significant impact on the future of information retrieval (IR) systems, and that it is desirable that these systems are made open to all. Some problems are outlined that may prevent the uptake of open source IR systems and a number of open source IR systems are described.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 4 · 2003 · pp. 217-222
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310486575

Introduction

It is argued here that open source software development is a promising method for producing information retrieval (IR) systems. Open source software is available freely (usually on the Web), and the source code is available so that changes may be made as required. Software which enjoys wide use has the most to gain from open source, and IR systems are likely to be increasingly used as more and more people and the organisations they work for require Web or intranet search. The paper is organised as follows. In order to give the reader some background in the area of open source software a description of this type of development is given. Then some of the systems that are mature and available for use by IR researchers and practitioners are outlined. An argument is provided for open source IR systems, followed by an outline of the potential problems and obstacles that may counter the benefits of open source in IR. Finally, an agenda is set for open source IR software in the conclusion.

Open source software

Open source software (Feller and Fitzgerald, 2002) is where the source code of programs is made freely available for anyone to change and distribute providing they abide by the accompanying licence. This differs from closed source or propriety software which may only be obtained by some form of payment, either by purchase or by "leasing". The difference between open and closed source can be characterised by the word freedom: users of open source software have the freedom to alter the source code while users of closed source software do not.

There are many licences available for use with open source software (Feller and Fitzgerald, 2002), but the most popular of these is the GNU Public Licence (GPL). The GPL gives programmers the right to alter software and re-distribute it, providing that the changes they have made are available to other programmers: this concept is known as copyleft. Thus the GPL is said to be "viral" (Feller and Fitzgerald, 2002): any software

Received 17 February 2003
Revised 10 April 2003
Accepted 17 April 2003

which uses the GPL must itself be released under the GPL. The reasoning behind copyleft is to prevent propriety software houses from exploiting the (often unpaid) work of open source programmers, without some recompense.

Systems currently available

There is a wide range of open source IR systems available on the Web from sites such as sourceforge.net and freshmeat.net. These systems can be categorised into two main groups: those that use inverted files and those that use database systems. We provide a short description of a small number of systems, which are mature or have been used by either IR practitioners or researchers and which used the inverted file approach. All of these systems are free software and most are released under the GNU Public Licence (GPL). The systems we concentrate on are Xapian, Swish++, Senga, ht://Dig, Isearch Oasis, MG and Lemur (other freely available IR systems found in the course of our investigation are listed in the Appendix).

Xapian (http://sourceforge.net/projects/xapian/)

Xapian has had something of a chequered history. It was originally developed under the name of Open Muscat (Porter and Boulton, 2000) by BrightStation PLC, changed its name to Omsee and then to OmSeek when the BrightStation open source project was closed down (due to financial problems unrelated to the project itself), and then to Xapian. However, it continues to be developed under the GNU Public Licence (GPL).

Xapian is not a program but a suite of libraries providing an Application Programming Interface (API) for services such as indexing, search and relevance feedback. Stemming functions are provided for English and many other European languages. The library is written in C++, but APIs to other languages such as Perl and Python are also available. The model provided as part of the search service is the Robertson/Sparck Jones probabilistic model (Robertson and Sparck Jones, 1976) and the weighting function used is BM25 (Robertson *et al.*, 1995). Boolean and phrase search facilities are also provided. Examples of how to use the search and index facilities are provided.

Swish++ (http://homepage.mac.com/pauljlucas/software/swish/)

Swish++ (Simple Web Indexing System for Humans) is a Unix based indexing and search engine that has been ported to MS Windows. It is a C++ rewrite of Swish-E (http://sunsite.berkeley.edu/Swish-E/), a system developed for Web search. Swish++ offers command line services for Web crawling, indexing and facilities to create a search server. Non-text documents such as Microsoft Word documents can be indexed. Swish++ at present only handles the English language. The search model used in the software is Boolean, but some form of ranking function is provided (the term weighting model is not specified). A significant problem with both systems is that neither Swish-E nor Swish++ has the ability to merge intermediate results: the user is expected to increase the memory capacity of the hardware in order to handle large collections. This is not an appropriate strategy for an information retrieval system.

Senga (http://www.senga.org/)

Senga (like Xapian) is a library of C++ routines for developing information retrieval systems. Unlike Swish++, the developer must write his/her own query and document parsers. No stemming facilities are provided (unlike Xapian). Senga therefore provides a basic library for IR systems development. Senga shares some programming effort with ht://Dig, a good example of collaboration between two development groups. The system appears to allow programmers to define their own weighting function, so in theory any term weighting model could be supported. Senga has the ability to support updates, therefore dynamic indexes can be supported. The author had problems in building executables from source code for this system: no answer was ever provided to his query and development work appears to have stalled.

ht://Dig (http://www.htdig.org/)

The ht://Dig system has already been mentioned in connection with Senga. This system provides programs to crawl Web sites (or Dig them in their nomenclature), merge data from existing database or newly found documents, and finally to search document and word databases. Search facilities include ranking and Boolean models, as well as special functions for multiple keyword search and building synonym databases. The ranking function is an *ad hoc* one and scores words nearer the top of the document higher than those nearer the bottom. The ability to define a front-end Web page for search is provided. The system appears to be quite widely used and there is much development work being done on it. There appear to be some problems on Linux versions: the author wasted the best part of a day trying to fix an intermittent bug that crashed the system and was impossible to find.

Isearch (www.etymon.com/Isearch)
Isearch was written to resolve perceived problems with freeWAIS, in particular that the search engine and retrieval protocol were mixed in together (Nassar, 1997). Apart from the article by Nassar (1997) there is very little documentation on the detailed facilities, but looking at the source code modules it is clear that functions such a geographical and date search are supported. Ranking is supported, but the model and functions used by the system are not declared. Nested Boolean searches are allowed, as is phrase searching and right truncation. Isearch gives the user the ability to index various formats such as HTML, SGML, Medline and USMARC. The code is no longer being developed and a replacement called Amberfish((which is able to deal with structured XML documents) has been developed to replace it.

Oasis (http://oasis-europe.org)
Oasis (Kluev, 2000) differs from the systems described above, as it is a program for distributed search on the Internet. The base system used for search is Isearch (see above). It filters out collections using server selection methods and submits queries to distributed sites, merging the results from them. Oasis uses artificial intelligence and neural network techniques for server selection and query processing. The architecture used is basically three-tier middleware: the client sends a query to any Oasis server which contacts other Oasis servers available to obtain results. Oasis provides synchronous and asynchronous modes: in the latter the server acts as an intelligent agent. A collection broker chooses the servers, but it is not clear how server selection is done. Results are merged using a neural network technique that also removes duplicate entries: it is entirely possible that duplicate sets of results can be generated in this type of architecture. Crawler services are provided for collection building: these are described in Kluev (2000). The system also supports relevance feedback.

MG (http://www.cs.mu.oz.au/mg/)
Managing Gigabytes or MG for short (Witten *et al.*, 1999) is a text retrieval system that has been developed to investigate various aspects of compression for inverted lists. The code is released under the GPL, but is no longer being actively developed: further development is in the closed source model. The system provides facilities for indexing collections and searching them using either the Boolean or Vector Space models. The book by Witten *et al.* (1999) gives detailed information on the compression methods used in MG: there is also a guide to MG in the appendices of the book.

Lemur (http://www-2.cs.cmu.edu/~lemur)
Lemur is a toolkit which is being actively developed by both the University of Massachusetts and Carnegie Mellon University to be used for research into the areas of language modelling and information retrieval. The toolkit allows programmers to develop all kinds of information retrieval systems such as cross-lingual IR and text filtering/classification. The system can either work on Unix or Windows systems. The licence used is a private one.

The argument for open source IR systems

A number of factors demonstrate that open source software development works well (Moody, 2001). The biggest factor is parallel development and debugging. In closed systems development, programming effort is restricted to a small team, the only people who can address problems in the code. It is difficult for team members to test their software against real problems. With open source software we may have programming effort shared among programmers who may be widely distributed all over the world. The number of programmers who can tackle development is far more than any organisation that uses closed source development could ever deploy. Having this wide resource of programmers allows open source developers to distribute the functions of debugging and testing, deploying systems to real problems and identifying problems and errors which can be tackled far quicker than in closed source development. It is estimated that up to 70-80 per cent of the cost of software is on maintenance (Feller and Fitzgerald, 2002, p. 147): the potential economic benefits of sharing these overheads are clear. Another clear advantage is in the management of the projects. Although there will be one or two project leaders in open source projects, in the main each developer will work independently without the need for any significant direction (they volunteer to tackle a well defined specific problem) or the need for communication with everyone on the team. In closed source development, significant project management is required which results in problems outlined by Brooks (1982), notably the offset between using more programmers on a project and the level of communication between them.

The significance of this type of development is that new IR algorithms and models can be released into the community very quickly for practical application and deployment. This contrasts with IR ideas developed in closed source systems. These remain secret and unused, often untested and uncompared using standard test collections such as TREC (Voorhees and Harman, 1999). These ideas are lost to the community who have no chance to discuss their impact. Porter and Boulton (2000) assert that mutual suspicion between IR practitioners in industry and IR researchers in academia was caused by closed and proprietary software development methods. To the industrialists, IR researchers did not understand the realities of dealing with real world problems and were stuck in theoretical ideas that do not tackle them. To the academics, people in industry did not understand the theory of IR and stole their ideas without giving them the credit they thought was due. Porter and Boulton (2000) argue that this lack of co-operation between the two camps has been damaging to both.

While the survey in the section on "systems currently available" is by no means exhaustive, it is clear that some of the arguments given here are illustrated by examples in open source systems. There is clear co-operation between Senga and ht://Dig as well as between Oasis and Isearch, for the benefit of both sets of groups. However, it is also clear that some open source developers are completely unaware of progress made in IR theory: term-weighting functions used in many surveyed systems are either undeclared or *ad hoc*, with little or no theoretical underpinning to them. It is very hard for software developers, who are interested in developing systems, to keep up with new ideas emanating from the world of IR research.

Potential problems and obstacles

Although open source development has shown in many cases to be successful, there are potential problems (Moody, 2001). Commercial companies do not always see the benefits, and are under significant pressure from shareholders who do not understand the open source development model. A case in point is BrightStation and Xapian. This (and other human factors) may cause forks. A fork occurs in open source development when a group developing open source software splits into two or more groups. This means that the groups will often duplicate work, wasting time and effort obviating the benefits listed above for open source development.

The impact on IR system developers can be considerable. The author found 36 open source IR systems in the course of his investigation. It is entirely possible that there are more systems available on the Web and from other sources. Proliferation may be no bad thing to begin with in order to share ideas, but at some stage it would be a good idea to coalesce the ideas from these systems in order to get the best of them and hence to share them. In the long run it is desirable that only a few systems be available for reasons given above. However, the author does not want to put off IR researchers or developers from releasing their code: going open source is another way of sharing ideas. One of the main reasons for publishing the material here is to encourage IR practitioners and researchers to share ideas, coalesce them from different systems and to prevent forks before they happen. The author accepts that it will be impossible to coalesce all the open source

IR systems into one for significant political, social and software engineering reasons (e.g. differences in programming languages).

There is potential for wasted effort in finding problems in the software. For example, we may have many programmers looking at the same chunk of code, duplicating debugging effort and therefore reducing overall efficiency of the open source software development model (McConnell, 1999). There is also a workload deployment issue: for example some programmers have stronger expertise in some areas than other programmers (McConnell, 1999). There is an offset when maintaining software in the benefits of sharing maintenance and loss due to wasted effort. This is a significant area of research in open source software (Feller and Fitzgerald, 2002).

Another significant factor and one that has received little attention is usability. Nichols *et al.* (2001) argue that open source software projects need to adapt in order to produce systems that can be used by a typical and non-technical user. The basic problem is that most open source systems are written by programmers who do not understand end user needs and whose software is often complex and difficult to use. For example, a quick look at some of the indexing methods used by systems in this survey has revealed how difficult and complicated creating an index is. Often significant technical knowledge is needed in order to make the process work correctly or efficiently. This is a serious problem, and given the importance of interaction in IR systems it is one that must be addressed by open source IR developers.

Conclusion: the way forward

The benefits of sharing ideas between IR industrialists and researchers are clear. People in industry often have access to users which IR researchers can only dream of. Ideas can be tested out in real situations, often anonymously without reference to the users or publishing the material. These ideas can be embodied in the systems themselves and downloaded for use in either research or deployment in real world search. This author believes that good new ideas should be available to all, and both IR industrialists and academics stand to gain from closer co-operation. Programmers who work on open source IR systems should be encouraged to consider the issue of usability and where possible to coalesce their systems. The author is aware, however, that efforts are being dissipated in the development of open source IR systems, and may thus prevent the obvious benefits in using the open source development model. It is hoped that further research into the open source development model will be able to show tangible benefits, and that this will impact positively on using such a model to produce IR systems.

References

Brooks, F.P. (1982), *The Mythical Man-month: Essays on Software Engineering*, Addison-Wesley, Reading, MA.

Feller, J. and Fitzgerald, B. (2002), *Understanding Open Source Software Development*, Addison-Wesley, London.

Kluev, V. (2000), "Compiling document collections from the Internet", *SIGIR Forum*, Vol. 34 No. 2, pp. 9-14.

McConnell, S. (1999), "Open source methodology: ready for prime time?", *IEEE Software*, Vol. 16 No. 4, pp. 6-11.

Moody, G. (2001), *Rebel Code: Linux and the Open Source Revolution*, Allen Lane, London.

Nassar, N. (1997), *Searching with Isearch*, available at: www.webtechniques.com/archives/1997/05/nassar/ (accessed 9 December 2002).

Nichols, D.M., Thomson, K. and Yeates, S.A. (2001), *Usability and Open Source Software Development*, Department of Computer Science, University of Waikato, available at: www.cs.waikato.ac.nz/~say 1/pubs/oss.pdf (accessed 15 January 2003).

Porter, M.F. and Boulton, M. (2000), "Open Muscat, an open source search engine", *SIGIR Forum*, Vol. 34 No. 1, pp. 16-17.

Robertson, S.E. and Sparck Jones, K. (1976), "Relevance weighting of search terms", *Journal of the American Society of Information Science*, May-June, pp. 129-45.

Robertson, S.E., Walker, S., Jones, S., Hancock-Beaulieu, M.M. and Gatford, M. (1995), "Okapi at TREC3", in Harman, D.K. (Ed.), *Proceedings of Third Text Retrieval Conference, Gaithersburg, November 1994, NIST Special Publication 500-226*, NIST, Gaithersburg, pp. 109-26.

Voorhees, E.M. and Harman, D.K. (Eds) (1999), *The Seventh Text Retrieval Conference (TREC-7), NIST Special Publication 500-242*, NIST, Gaithersburg, MD.

Witten, I.H., Moffat, A. and Bell, T.C. (1999), *Managing Gigabytes*, 2nd ed., Morgan Kaufmann, San Francisco, CA.

Appendix

Table AI Other open source/free software IR projects

Project name	URL	Stage	Licence	Other information
Alkaline	alkaline.vestris.com	Stable	Private	Free for non-commercial use
Amberfish^{R}	www.etymon.com/amberfish	Stable	GPL	Process structured XML
Glimpse	webglimpse.net	Stable	Private	Free for non-profit organisations
Ongobongo	ports.tolkien.dk/ongobongo	Alpha	GPL	Uses PostgresQL
Perlfect	perlfect.com/freescripts/search/	Stable	GPL	–
ROADS	www.roads.lut.ac.uk	Stable	GPL	Yahoo like
SEARCH.PHP3	www.w3webmaster.com/search/install.shtml	Stable	GPL	Uses MySQL
YASE	www.mazumdar.demon.co.uk/yase_index.html	Beta	GPL	–
Exist	exist.sourceforge.net	Beta	LGPL	Uses RDMS
PhpDig	phpdig.toiletoine.net	Stable	GPL	Uses MySQL
NISs	sourceforge.net/projects/niss	Planning	GPL	–
Anarchivist	sourceforge.net/projects/anarchivist	Planning	GPL	Rewrite of AustLII
ASPSeek	www.aspseek.org	Stable	GPL	Uses SQL
HISS	sourceforge.net/projects/hiss	Planning	GPL	–
Latente	sourceforge.net/projects/latente/	–	–	Uses Java
NeatSeeker	neatseeker.sourceforge.net	Stable	Apache	–
Nose	sourceforge.net/projects/nose	Planning	GPL	–
OpenFTS	openfts.sourceforge.net	Stable	GPL	Uses PostgresQL
Oxyus	sourceforge.net/projects/oxyus	Pre-Alpha	Apache	–
Ransacker	ransacker.sourceforge.net	Alpha	GPL	Uses Python
siteIndexer	sourceforge.net/projects/siteindexer	Alpha	GPL	Uses MySQL
SPINdex	mattwork.potsdam.edu/projects/spandex	Stable	GPL	–
Doc Fox	sourceforge.net/projects/docfox	Planning	BSD	–
MPS Information Server	www.fsconsult.com	Stable	Private	–
Lucene	jakarta.apache.org/lucene/	Stable	Apache	Uses Java
freeWAIS-sf	ls6-www.informatik.uni-dortmund.de/lr/projects/freeWAIS-sf	Stable	Private	–
Harvest	www.tardis.ed.ac.uk/harvest	Stable	Private	–
Zebra	Indexdata.dk/zebra	Stable	Private	–
Personal Librarian	www.pls.com	Stable	Private	–

Training cataloguing students using a mix of media and technologies

Linda M. Cloete
Retha Snyman and
J.C. Cronjé

The authors

Linda M. Cloete is a Senior Lecturer in the Department of Library and Information Studies, Florida, Johannesburg, South Africa. **Retha Snyman** is Professor in the Department of Information Science, University of Pretoria, Pretoria, South Africa. **J.C. Cronjé** is a Professor in the Faculty of Education, University of Pretoria, Pretoria, South Africa.

Keywords

Cataloguing, Computer based training, Distance learning, Training, South Africa

Abstract

The appropriateness of utilising a training resource programme consisting of a mix of media and technologies for the training of cataloguing students is evaluated. The findings from reported research and evaluation of the training resource programme made it possible to identify advantages and disadvantages of using such a programme. The results of the research enabled the researcher to derive guidelines for the design and development of a training resource programme consisting of a mix of media and technologies. The use of media and technologies, in a training research programme for cataloguing training, can be utilised in training cataloguing students in contact classes, distance education as well as in-service training.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 4 · 2003 · pp. 223-233
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310486584

Introduction

This article reports on the utilisation of an integrated training resource programme consisting of a mix of media and technologies for the education and training of cataloguing students of Technikon SA, a distance education institution in South Africa.

The mix included:
- printed study texts;
- a CD-ROM-based computer program composed in Authorware;
- Internet-based virtual campus facilities;
- communication channels such as e-mail; and
- contact classes.

The training programme was used for training cataloguing students in contact classes, distance education and in-service training.

The purpose of the research on which this article reports was two-fold: first, to determine the advantages and disadvantages of training cataloguers by means of such a mix of media and technologies; and second to establish design criteria for mixed-modal training of cataloguers.

Background

The Department of Library and Information Studies at Technikon SA offers training in library and information science through distance learning to students who already work in libraries and information services as administrative assistants and who wish to become fully qualified librarians and information workers. Students work in a wide range of environments:
- community libraries in rural areas;
- public libraries in urban areas;
- academic libraries at universities and technikons; and
- specialised information centres.

The core modules of the library and information studies curriculum are:
- library and information practice;
- information retrieval (including cataloguing training);
- library and information technology; and
- user studies.

Received 12 November 2002
Revised 9 April 2003
Accepted 20 April 2003

The training of cataloguers forms an important part of the education and training of librarians since cataloguing is still considered one of the most important skills for organising information (Smith, 1985; Stieg, 1992; Clack, 1993). Bender (cited in Bearman, 1987) mentions that:

> ... traditional skills associated with acquiring, organizing, and disseminating information will still be needed by tomorrow's information professional at the entry level.

One of the most important skills for organising information is cataloguing. The automation of libraries has also changed the nature of the work in cataloguing departments. The functions and tasks of librarians in cataloguing departments have changed. However, bibliographic work can never be completely computerised. Human input, especially with regard to authority control, is very important (Snyman, 1998). Co-operative cataloguing has become an important function amongst libraries. Copy cataloguing is now one of the most important tasks of cataloguers. To adapt and utilise a copy record for a library's own purposes, it is essential that the cataloguer have a sound knowledge of cataloguing principles. Such knowledge can only be achieved through proper education and training in cataloguing. Zyroff (1996) mentions a number of valid reasons why training in cataloguing should now, even in the age of automation, co-operative cataloguing and shared cataloguing, still be considered a core competency. Her statement that:

> ... [t]hose who have not spent time applying and creating subject and name headings, authority records, descriptive cataloguing and classification codes, and indexing norms don't have in-depth perspective on the structure of information ...

captures the essence of organising information. Cataloguing skills also play an important role in the organisational aspects of knowledge management (Hill and Intner, 1999). It has therefore become more important than ever that cataloguers receive appropriate education and training through all possible modes.

Cataloguing training is usually conducted by the following means:

- contact training;
- distance learning; and
- in-service training.

There are some limitations associated with the above-mentioned training means.

During contact training students attend lectures and conduct practical sessions where students practice cataloguing techniques. At the contact training institutions it is not always possible to expose students to sufficient practical training. Lecturers' time is restricted to the lecturing periods and student assistants are usually not experienced enough to facilitate all the required practical training sessions effectively.

The education and training of Library and Information Science students in South Africa through distance learning is becoming more popular, since an increasing number of students are unable to afford the luxury of full-time studies at a contact class institution. Distance learning has traditionally been provided at institutions such as Technikon SA through paper-based correspondence. In distance education as a method of tuition the written word is the main medium of instruction. Interaction between the lecturer and student is limited to course material and books, completed assignments from the students and projects related to their work experience. This low level of interaction between lecturer and student has led to a number of problems in the education and training of cataloguers. Students often need an immediate answer to a question or problem in a practical exercise for them to continue to the next step. With paper-based distance education they usually have to wait weeks to receive an answer to problems encountered during the study of a particular skill. Other delivery modes such as audio, video and computer technologies are also utilised in distance education (Steiner, 1998), but the time delay in interaction between the student and lecturer still exists. Asynchronous instruction has the advantage that students may choose their own instructional time, but there is no real-time interaction and immediate feedback from the lecturer.

Usually, when graduates enter cataloguing posts they need a refresher course in cataloguing conducted by the supervisor or senior staff member of the department. They also need in-service training to understand and master the specific procedures at the library where they are employed. Library assistants or clerks (without any formal library education or training) are often employed in cataloguing departments to perform certain routine, administrative cataloguing tasks. They are given in-service training by the supervisor or senior staff member. These in-service training periods take about six to nine months to complete. During that period the trainee cataloguer is not very productive as far as work output is concerned. Moreover, the supervisor or senior staff member conducting the training has to perform this function, which includes evaluating the trainee's work and discussing problems, on a full-time basis. This means that this senior staff member does not perform other cataloguing tasks for which he/she has originally been appointed.

Henderson (1987) suggests that cataloguing students should be presented with sound educational experiences and that enthusiasm for the subject should be fostered. Hill (1985) states that too few students are exposed to the fun of cataloguing and do not appreciate the intellectual exercise. Real meaningful learning does not take place in the classroom setting, but only when students have the opportunity to apply the instruction. Students should have the opportunity to work on real problems under real conditions (Zuber-Skerritt, 1993). Such opportunities are referred to as active learning, where the students approach the course content through problem-solving exercises (Romero, 1995). Apart from problem-solving skills, analytical thinking and decision-making skills form an important part of cataloguing (Connaway, 1997; Olson, 1997). De Boer *et al.* (2001) report that the thinking preferences of cataloguing students at the University of Pretoria do not correspond to the skills and techniques required in cataloguing. The students specifically do not like analysing, problem solving, implementing and organising skills. Yet, these skills are essential for cataloguing tasks. The suggestion is that more attention should be given to the less preferred but essential preferences; and that teaching methods should be adapted to use preferences to develop needed skills. Activities such as simulations, case studies and small group activities could all form part of active learning. This is especially applicable to a cataloguing course.

A training resource that includes interactive instruction with the utilisation of multimedia could provide this meaningful learning opportunity.

According to Clack (1993), cataloguing teachers and trainers:

> . . . must be innovative in their teaching strategies and methodologies.

Training should not only be done for present practice, but also for the future.

The right tools for the task

> It has been said that " . . . if your only tool is a hammer, every problem looks like a nail . . . " Multimedia provides us with more tools. It is, however, important to choose the right tool for the task (Folkers, 1994).

According to the well known and much disputed "no significant difference phenomenon", no matter who or what is being taught, the utilisation of various media will produce the same learning results. Evidence for this argument is based on hundreds of media comparison studies produced since the 1920s (Russell, 1999). Russell, however, does believe:

> . . . that differences in outcomes can be made more positive by adapting the content to the technology.

In going through the process of redesigning a course to adapt the content to the technology, it can be improved.

The question with regard to the training of cataloguing students is: would these students not learn from traditional print-based correspondence courses as well as they would from various other media and technologies? To answer this question, a study similar to the many quoted by Russell (1999) would have had to be conducted, specifically focusing on cataloguing students. The result would probably have been the same: no significant difference. The purpose of this study, however, is not to find a few technologies or media that might achieve improved learning results, but to establish how the available technologies and media should be utilised and combined to provide an active learning environment for cataloguing students.

The utilisation of educational technology, especially computer-aided and Web-based training, influence education design and development tremendously. Outcomes-based education and educational technology play a vital role in the design and development of training and have to be considered in such studies.

We needed to determine whether developments have taken place in the utilisation of a mix of appropriate media and technologies in the training of cataloguers, and if so, what these developments are, in order to adapt existing developments or develop new training resources. The question was investigated by means of an analysis of reported research and by evaluating a training resource consisting of a mix of media and technologies. The training resource consisted of:

- print material (study guides, tutorial letters and prescribed books);
- practical exercises (drill exercises in print format);
- contact classes;
- communication channels, such as e-mail;
- a mentor system;
- a Web-based system (Technikon SA Co-operative Online Learning (TSA COOL) virtual campus); and
- a computer-based tutorial and simulation program.

For the purposes of this study it is believed that the study guide that consists of printed study text as well as drill exercises should form an integral part of a training resource. All the students receive study guides and printed material is considered the main medium for training.

Contact classes involved group discussion opportunities conducted monthly in the regions where the largest student numbers are concentrated.

Communication channels included telephone, fax and electronic mail.

The mentor system is a form of experiential learning conducted at libraries where students do practical projects under the guidance of a mentor. Students are advised (and encouraged) by duly qualified and experienced practitioners (or mentors).

TSA COOL is combined with the traditional print-based distance education media and could therefore be referred to as a hybrid campus. TSA COOL partially supports a constructivist paradigm in that it encourages collaborative learning. Collaboration takes the form of group activities, a discussion group facility, links to sites with related topics, an e-mail facility to the authors of the site and contact with live subject matter experts. TSA COOL promotes discovery learning in that it has links to other organisations' Web sites. The welcome screen of TSA COOL is shown in Figure 1.

In Figure 2 the discussion group facility is illustrated.

The computer program provides additional practice for cataloguing students and includes: true and false questions, multiple-choice questions, completing diagrams and flow charts, and placing books in their correct positions on shelves. Figure 3 is a screen shot of a book classification exercise of the computer program.

Research methods

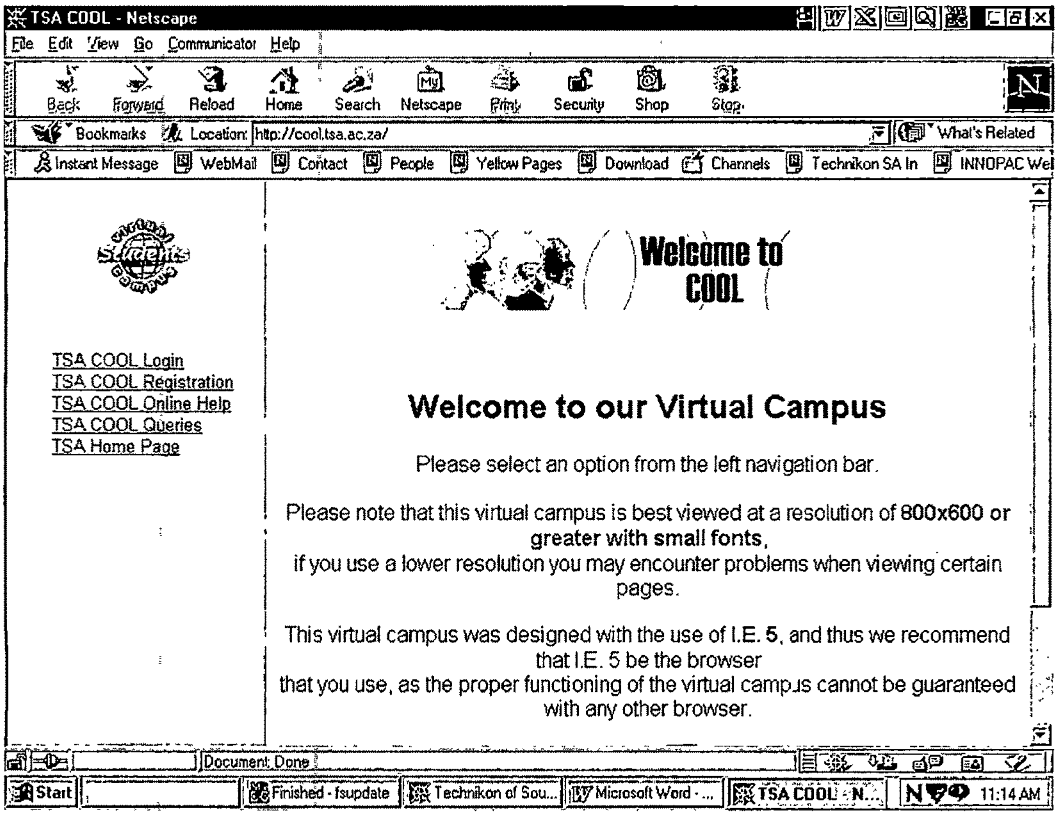
The training resource was developed as a combination of various media and technologies to present the cataloguing course. The research, conducted to determine the implications of such a multi-modal approach, was primarily qualitative. Questionnaires, interviews, observations and focus group discussions were used to evaluate students' experience of the resource. A pre-test/post-test design, or a media comparison study, was not conducted, as we accept Russell's (1999) proposal that the choice of medium would make no significant difference to the academic results.

Questionnaires were sent to all the students (109) registered for the first registration period of 2001. Questionnaires were used to test the experience of the wider population of students. The purpose of the questions was to obtain simple reflections from the student's recent experience with the programme. Students completed the questionnaire after spending some time using the resource.

Observations were made and interviews and focus group discussions were held with students (individually and in groups of five to ten students) who could attend contact sessions at Technikon SA's main campus in Florida (Johannesburg, South Africa).

Observations entailed that the researcher was present with some of the students while they worked with the components of the training resource, to record noteworthy incidents and comments. Laurillard (1994) considers observation an extremely rich and useful data collection method that can be carried out very quickly. The unconstrained data collection process complements the closed evaluation techniques such as questionnaires. In the evaluation exercise one

Figure 1 Welcome screen of TSA COOL


TSA COOL - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop Stop
Bookmarks Location: http://cool.tsa.ac.za/
What's Related
Instant Message WebMail Contact People Yellow Pages Download Channels Technikon SA In INNOPAC Wel
Welcome to COOL
TSA COOL Login
TSA COOL Registration
TSA COOL Online Help
TSA COOL Queries
TSA Home Page
Document: Done
Start
Finished - fsupdate
Technikon of Sou...
Microsoft Word - ...
TSA COOL - N...
11:14 AM

Welcome to our Virtual Campus

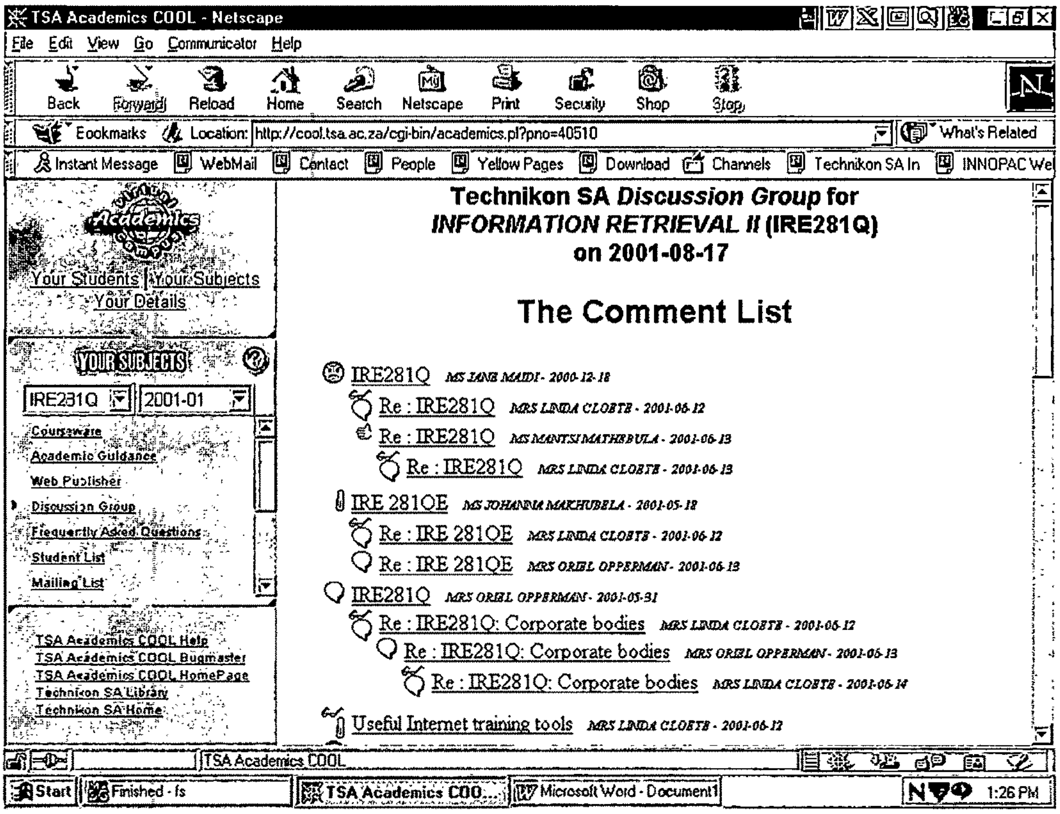
Please select an option from the left navigation bar.

Please note that this virtual campus is best viewed at a resolution of 800x600 or greater with small fonts,
if you use a lower resolution you may encounter problems when viewing certain pages.

This virtual campus was designed with the use of I.E. 5, and thus we recommend that I.E. 5 be the browser
that you use, as the proper functioning of the virtual campus cannot be guaranteed with any other browser.

or more students used the training resource and discussed it as they used it. The "conversation" was observed (without interference), and much was learnt about students' experience of the resource. Observation helps designers to understand

Figure 2 Discussion group facility on TSA COOL

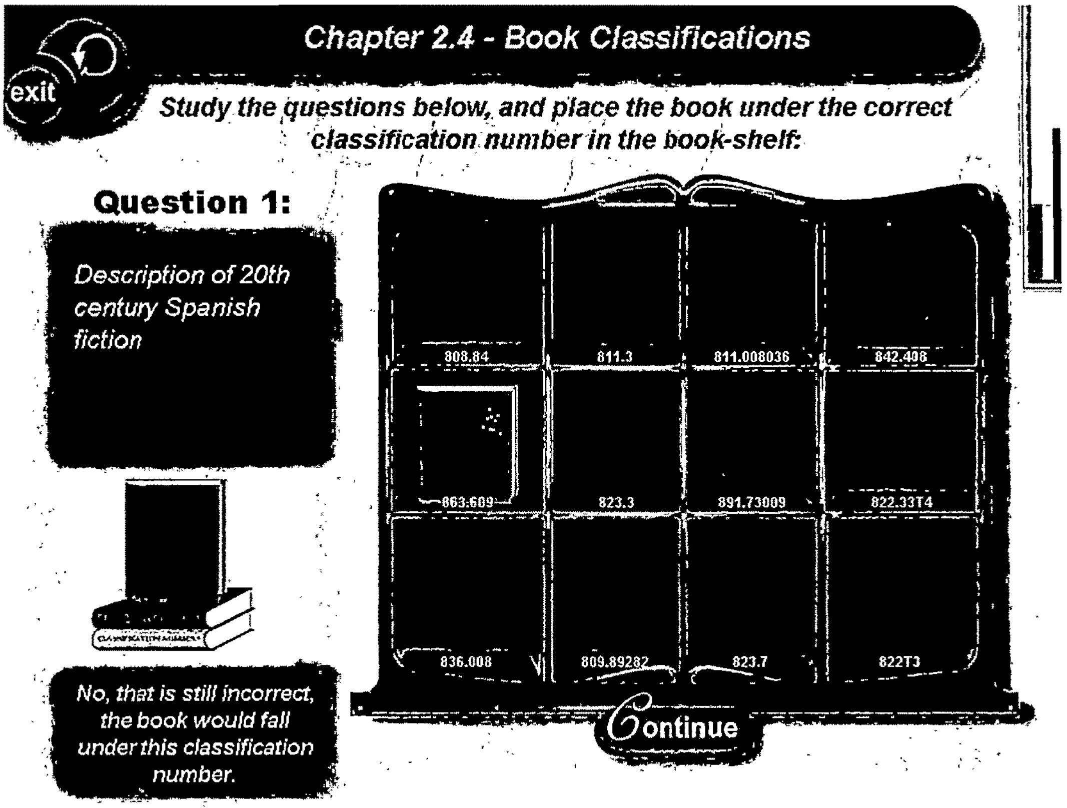

TSA Academics COOL - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop Stop
Bookmarks Location: http://cool.tsa.ac.za/cgi-bin/academics.pl?pno=40510
What's Related
Instant Message WebMail Contact People Yellow Pages Download Channels Technikon SA In INNOPAC Wel
Academics
Your Students | Your Subjects
Your Details
YOUR SUBJECTS
IRE281Q
2001-01
Courseware
Academic Guidance
Web Publisher
Discussion Group
Frequently Asked Questions
Student List
Mailing List
TSA Academics COOL Help
TSA Academics COOL Bugmaster
TSA Academics COOL HomePage
Technikon SA Library
Technikon SA Home
TSA Academics COOL
Start
Finished - fs
TSA Academics COO...
Microsoft Word - Document1
1:26 PM

Technikon SA *Discussion Group* for
INFORMATION RETRIEVAL II (IRE281Q)
on 2001-08-17

The Comment List

- IRE281Q *MS JANE MAIDI - 2000-12-18*
  - Re : IRE281Q *MRS LINDA CLOETE - 2001-06-12*
  - Re : IRE281Q *MS MANTSI MATHEBULA - 2001-06-13*
    - Re : IRE281Q *MRS LINDA CLOETE - 2001-06-13*
- IRE 281QE *MS JOHANNA MAKHUBELA - 2001-05-18*
  - Re : IRE 281QE *MRS LINDA CLOETE - 2001-06-12*
  - Re : IRE 281QE *MRS ORIEL OPPERMAN - 2001-06-13*
- IRE281Q *MRS ORIEL OPPERMAN - 2001-05-31*
  - Re : IRE281Q: Corporate bodies *MRS LINDA CLOETE - 2001-06-12*
    - Re : IRE281Q: Corporate bodies *MRS ORIEL OPPERMAN - 2001-06-13*
      - Re : IRE281Q: Corporate bodies *MRS LINDA CLOETE - 2001-06-14*
- Useful Internet training tools *MRS LINDA CLOETE - 2001-06-12*

Figure 3 Book classification exercise



Chapter 2.4 - Book Classifications

Study the questions below, and place the book under the correct classification number in the book-shelf:

Question 1:

Description of 20th century Spanish fiction

No, that is still incorrect, the book would fall under this classification number.

not only where the resource fails, but why, and what needs to be done about it. One must, however, keep in mind that what students say they "like" or "prefer" may not necessarily be the best for learning.

The open-ended nature of interviews can help to establish what aspects should be further investigated with the closed form of the questionnaire (Laurillard, 1994). On the other hand, certain information obtained from questionnaires can be further investigated in greater depth by interviewing respondents to the questionnaires. Interviews and informal discussions were held with the students who used the resource. These interviews were conducted after the questionnaire had been completed. The interviews and comments provided the opportunity to clarify certain comments made by the students and aspects indicated in the questionnaire.

Findings

The aim of this research was to determine the implications of a blended approach to the training of cataloguers. Initial findings from the literature and evaluation of the training resource programme are summarised as follows (Cloete, 2001):

- The utilisation of various media will produce the same learning results.
- Library and information study students often receive lectures or notes about computers and computer software rather than hands-on experience or computer-aided simulations.
- In the international literature few references are made to the utilisation of computer-aided instruction in cataloguing training.
- No references in the national literature could be found to the use of computer-aided training in cataloguing courses.
- Drills, practice and simulations are the instructional strategies that could be considered for a mix of media and technologies.
- Students were generally satisfied with the training resource programme.

A comparison between suggestions from the reported research regarding online training in general and findings of our evaluation of the blended training resource programme for cataloguers is shown in Table I.

Table I Comparison between suggestions in literature and findings from evaluation

Literature suggests	Findings from evaluation
Students expect lecturers to respond to their e-mail messages almost immediately and can be more demanding online than in person (Rea *et al.*, 2000)	Students send a follow-up e-mail within a couple of hours to a day if a response to an original e-mail was not sent. Even if they did not ask a question, but only e-mailed work, they want a response. The same, however, also applies to telephone messages and faxes
Lecturers must spend time and energy on the virtual campus site to ensure that the site is working properly and all information is up to date. This means extra work, but this tends to decrease over time (Rea *et al.*, 2000)	Initially it took time to set up all the information, links, FAQs, discussion groups and academic guidance for the subject on TSA COOL. Once the site has been set up, it has to be monitored regularly for students' inputs. Outdated information is removed once a month and new information is added as it becomes available
Students expect information such as the syllabi, previous examination papers and notices on the virtual campus site (Rea *et al.*, 2000)	Once students became aware that previous examination papers were available on TSA COOL, they expected them shortly after each examination period and made enquiries if the papers were not immediately available
The utilisation of drills and practice helps students to review, remediate, rehearse and practice (Erickson and Vonk, 1994)	Students found the drill-type exercises in the computer program and questions for self-assessment on TSA COOL very helpful for practice
Immediate feedback and remediation to students' responses is very important (Hannafin and Peck, 1988)	Students expressed their appreciation for the immediate feedback and explanations in the computer program and TSA COOL's questions for self-assessment
Competition is considered an effective motivating technique (Erickson and Vonk, 1994)	Students found it challenging to have their performance assessed in the computer program and TSA COOL's questions for self-assessment and to have the opportunity to improve on their scores

From the above comparison it is evident that findings from the evaluation correspond mostly with suggestions from the reported research. We then needed to determine the advantages and disadvantages of utilising a mix of media and technologies in order to develop training that best suits the training needs of cataloguing students. The findings from the reported research and evaluation of the training resource programme to answer this question are summarised as follows (Cloete, 2001).

Advantages

- Students find it more interesting to work with different media and technologies.
- The limitations of one medium such as print can be overcome by the variety of other media and technologies.
- Students can work on the course whenever it suits them.
- Neither the distance that geographically separates students nor the time of day when it suits them to study placed limitations on their progress.
- A degree of individualised instruction was possible.
- The different media and technologies could provide a variety of information and additional exercises.
- The electronic media made it possible to train students in the specific skills of the cataloguing course, which was not possible through the print media.
- The electronic media made it possible to create simulations of cataloguing situations.
- Immediate feedback was possible through the facilities on the virtual campus and the computer program.
- Testing and retesting was possible with a computer.
- The variety of computer-based training stimulated students and promoted positive attitudes to learning.
- It was possible for the student to navigate the content.
- Connectivity enabled belonging to a discussion group so that students had the opportunity to give and share their opinions.
- The computer program and TSA COOL encouraged group work and collaborative learning, which helped students to get to know each other better, and reduced the social isolation associated with distance learning.
- Students could reflect and learn from other students when they participated in the discussion group facility on TSA COOL.

Disadvantages

- The electronic media were still very new to the students and they were therefore reluctant to use them.
- Students had difficulty in obtaining access to the Internet.
- Students did not all have adequate hardware or appropriate software to access the multimedia and interactive capabilities of the virtual campus.
- It took time and technical support to become a competent user of the virtual campus.
- Students considered the use of the electronic media and technology as extra work in an already demanding course.
- Lack of computer skills created problems for certain students to adjust to the electronic media.

We needed to determine how training by means of a mix of media and technologies should be designed in order to develop an appropriate training resource. To achieve this, it is necessary first to summarise what we had learned from this study. Second, guidelines for the design and development of a mixed mode training resource will be formulated. Third, possible future developments will be investigated. These issues will be discussed in the following sections.

What we learned from the study

- Students use media and technologies to meet their needs and not necessarily in ways expected by the lecturer.
- Students with little understanding of or familiarity with computers will find the use of media and technology difficult at first, and will have to spend more time on the media and technology than on the contents of the course.
- Frequent communication with students is essential.
- No assumptions should be made about students' abilities, experience, etc. A student profile should be compiled first.
- Students should be told exactly what they can and should do with each component of the training resource programme, for example what each function of a virtual campus is for and how to use it.
- Merely placing course material on the virtual campus, i.e. using it as just another delivery mode, should be avoided.
- Students do not use all their study material, but only what they consider essential for passing the course.
- The utilisation of a mix of media and technologies allows interaction between students, lecturers and sources of information.
- Many frustrations can be related to technical problems, e.g. Internet connections and download time. Technical problems diminish as students progress with the course.
- Students tend to forget that there is a variety of communication channels to the lecturer and fellow students. They often complain that geographical distance makes it impossible to benefit from the training. They need to be reminded of all the possible channels such as e-mail, fax and discussion groups.
- There is no definite preference for using the computer program in a group or individually. Students who worked on it during observations preferred to work in groups.
- The immediate feedback provided by the programme, which includes correct answers as well as explanations, was highly appreciated.
- Students start to use one component of the programme, such as the group discussion facility on the Internet, to organise another component, namely additional contact classes amongst themselves.

Guidelines for designing and developing a training resource programme

From the analysis of the literature and the evaluation of the training resource programme, it is now possible to derive the following guidelines for the design and development of a training resource programme consisting of a mix of media and technologies.

- A user-friendly design is essential to make all the components of the programme accessible to all students.
- Frustrations and problems related to the technical aspect should be counteracted, as such problems affect how students perceive and experience the programme.

Support should be available for all students. Networks must be stable to avoid problems with access and passwords, problems accessing information, slow response times and unreliable features.
- The programme should be suitable for group work or individual work.
- Immediate feedback in certain components of the programme is essential. Students need to know the correct answers immediately and, where applicable, explanations of incorrect answers should be given.
- Performance measurement is helpful to the students. This could be done in the same way as the score ratings given in many computer games.
- Navigation must be satisfactory. Students should be encouraged to read the guidelines and instructions before attempting the programme. Navigational help files should be made available at all times.
- There should be frequent, active involvement from the learner and lecturer, who, in fact should act more as a facilitator than a lecturer.
- Hypertext linkages should be used. These could be electronic links between related information chunks to expand ideas, learn related concepts, view document sources and stimulate additional learning. Hypertext linkages could provide immediate access to the most recent information.
- Multimedia (sound, graphics, colour and moving images) should be used functionally to enhance learning.
- Visual appeal: there should be a polished look to the programme with the colour, graphics, animation, etc.
- Communication channels such as e-mail and discussion groups should provide options for frequent interaction.
- Records of students' participation should be kept.
- It should be easy to update all information.
- Alternative instructional strategies should be created, each with appropriate multimedia materials, and students should be directed toward that strategy found to be most effective for their style.
- Individual students should be encouraged to participate in the discussion group facility. As in the contact classroom situation, students often do not respond to a question or statement if it is posed to them in general, but have to respond when they are addressed directly. In the discussion group, students could be encouraged by rewarding them for responding; for example five marks could be added to an assignment.
- Students working alone as well as those working in groups must benefit from the media and technologies.
- Regardless of the technical support provided, the lecturer must have a good knowledge of the media and technologies and be prepared to answer questions on equipment as well as content. A key feature should be that a variety of methods of interaction are available.
- A smaller pilot project that focuses on specific learners should be implemented. A traditional course should be run parallel to the paper-based system.
- It is essential that the lecturer gives students the necessary guidance and motivation they need for participating in the training programme.
- A great deal of interaction with students is necessary for them to comprehend the course material and new media and technologies effectively.
- The mixed mode training resource should function as a coherent whole.
- A training resource that suits the training institution's budget should be considered.

The possibilities of a training resource programme consisting of a mix of media and technologies for cataloguing students and their implications for instructional design and promotion of learning could be summarised as shown in Table II.

Developments towards a virtual cataloguing training classroom

The ultimate goal of the training resource programme was to develop an online, fully interactive course: an online virtual cataloguing classroom. This means that technology will be incorporated as a substitute for the classroom and traditional distance training methods. The students may never meet the lecturer in person. The virtual cataloguing classroom should

Table II Possibilities and implications of a training resource programme consisting of a mix of media and technologies

	Printed course material	Contact classes	Communication channels	Mentor system	Computer program	Web-based training and communication
Uses	Provides the contents of the course material and tutorial material. Includes exercises and activities to be answered in print format	Opportunity for face-to-face contact with the lecturer and fellow students. Students can discuss content problems and clarify issues	E-mail, fax, telephone and discussion group facilities can be used to communicate with the lecturer and fellow students to clarify course content problems or just exchange ideas and comments	Part of the experiential training component. Students conduct work-related projects (cataloguing) under the supervision of a mentor	Incorporation of multimedia to provide an element of reality. Graphics, sound and text attract attention. Incorporation of problem-solving situations	Incorporation of multimedia to provide an element of reality. Graphics, sound and text attract attention. Incorporation of problem-solving situations. Provides links to useful Web sites and documents
Implications	Must be designed very carefully with clear learning objectives to be met by the contents and evaluation methods applied in the training resource	Classes should revolve around students' needs and not become merely formal lectures	Students must be reminded of these opportunities and the responsible use of them should be explained to them	Clear guidelines should be provided to the students and mentors of what is expected from them	Students must become involved in the learning process. They must be engaged in solving problems related to cataloguing issues. Contents must be in audio-visual format with a high level of interactivity. Easy to use	Students must become involved in the learning process. They must be engaged in solving problems related to cataloguing issues. Site should incorporate interactivity. Site must be engaging and stimulating. Useful. Organised and easy to use

incorporate all the technologies already used and discussed. The course will then be offered over the Internet only. Weaknesses of this approach lie in the fact that students may become disassociated with the course since they do not feel involved. Lack of personal interaction may also contribute to this.

Since students are familiar with the traditional classroom set-up, the classroom metaphor could be kept. The classroom would serve as the interface in which students could present their own work and view the work of their fellow students. They can thus enter into the spirit of a physical classroom. Training of librarians in a virtual environment is further motivated by the move towards the virtual library or "library without walls". Soon more and more librarians will work in such an environment and therefore similar training would be considered appropriate.

Concluding remarks

Many of the requirements of trained cataloguers cannot be met in the traditional contact class or through the traditional distance training methods. The opportunities provided by the mixed mode training resource researched here should contribute to improved knowledge and interaction. It would offer students many more possibilities of interacting and being active in mastering the cataloguing course.

A number of advantages of utilising a mix of media and technologies were identified and are summarised as follows:

(1) Multimedia capabilities of the virtual campus and computer program mean that learners can access a variety of means of representing information. They can also be afforded opportunities to engage in active learning, working both alone and in groups.

(2) Students will not focus on the lecturer but rather on their own learning process. The tools provided by a training resource programme assist the students to rely on their own learning rather than being directed all the time. Lecturers are becoming learning facilitators.

(3) The fact that an overwhelming majority of students would use the training resource again and recommend it to others is an indication that further multimedia developments of the course are necessary.

(4) Apart from specific subject knowledge, the goal of the initial training of cataloguers must necessarily include basic training in the use and exploitation of media and technologies. The media and technologies play a threefold role:
  - they are essential computing and communication tools;
  - they are tools used in computerised cataloguing; and
  - they are a training resource, incorporating the most appropriate media designed to best meet the learning needs.

References

Bearman, T.C. (Ed.) (1987), "Educating the future information professional", *Library Hi Tech*, Vol. 5 No. 2, pp. 27-40.

Clack, D.H. (1993), "Education for cataloging: a symposium paper", *Cataloging and Classification Quarterly*, Vol. 16 No. 3, pp. 27-37.

Cloete, L.M. (2001), "The education and training of cataloguers: a training resource programme", unpublished doctoral thesis, University of Pretoria, Pretoria.

Connaway, L.S. (1997), "A model curriculum for cataloging education: the library and information services program at the University of Denver", *Technical Services Quarterly*, Vol. 15 No. 1-2, pp. 27-41.

De Boer, A., Coetzee, H.S. and Coetzee, H. (2001), "Teaching cataloguing and classification at the University of Pretoria: thinking preferences of second year students", *Libri*, Vol. 51 No. 2, pp. 114-23.

Erickson, F.J. and Vonk, J.A. (1994), *Computer Essentials in Education: The Teaching Tools*, McGraw-Hill, New York, NY.

Folkers, E.A. (1994), "Evaluation ... a reflection: evaluation issues in interactive multimedia", in Beattie, K., McNaught, C. and Willis, S. (Eds), *Interactive Multimedia in University Education: Designing for Change in Teaching and Learning: Proceedings of the IFIP TC3/WG3.2 Working Conference on the Design, Implementation and Evaluation of Interactive Multimedia in University Settings, Melbourne, Victoria, Australia, 6-8 July 1994*, Elsevier, Amsterdam, pp. 309-11.

Hannafin, M.J. and Peck, K.L. (1988), *The Design, Development, and Evaluation of Instructional Software*, Macmillan, New York, NY.

Henderson, K.L. (1987), "Some persistent issues in the education of catalogers and classifiers", *Cataloging & Classification Quarterly*, Vol. 7 No. 4, pp. 5-25.

Hill, J.S. (1985), "Wanted: good catalogers", *American Libraries*, November, pp. 728-30.

Hill, J.S. and Intner, S.S. (1999), *Preparing for a Cataloging Career: From Cataloging to Knowledge Management*, available at: ala.org/congress/hill-intner_print.html (accessed 2001).

Laurillard, D. (1994), "The role of the formative evaluation in the progress of multimedia", in Beattie, K., McNaught, C. and Willis, S. (Eds), *Interactive Multimedia in University Education: Designing for Change in Teaching and Learning: Proceedings of the IFIP TC3/WG3.2 Working Conference on the Design, Implementation and Evaluation of Interactive Multimedia in University Settings, Melbourne, Victoria, Australia, 6-8 July 1994*, Elsevier, Amsterdam, pp. 287-93.

Olson, H.A. (1997), "Thinking professionals: teaching critical cataloguing", *Technical Services Quarterly*, Vol. 15 No. 1/2, pp. 51-65.

Rea, A., White, D., McHaney, R. and Sánchez, C. (2000), "Pedagogical methodology in virtual courses", in Aggarwal, A. (Ed.), *Web-based Learning and Teaching Technologies: Opportunities and Challenges*, Idea Group Publishing., Hershey, PA, pp. 135-54.

Romero, L. (1995), "The cataloging laboratory: the active learning theory applied to the education of catalogers", *Cataloging & Classification Quarterly*, Vol. 21 No. 1, pp. 3-17.

Russell, T.L. (1999), *The No Significant Difference Phenomenon as Reported in 355 Research Reports, Summaries and Papers: A Comparative Research Annotated Bibliography on Technology for Distance Education*, North Carolina State University, Raleigh, NC.

Smith, L.E. (1985), "Where are the entry level catalogers?", *Journal of Library Administration*, Vol. 6 No. 2, pp. 33-5.

Snyman, M.M.M. (1998), "The standardisation of names and the provision of information", *Provision of Information in Southern Africa Conference, 20 August 1998*, Pretoria.

Steiner, V. (1998), *What is Distance Education?*, available at: www.fwl.org/edtech/distance.html (accessed 2001).

Stieg, M.F. (1992), *Change and Challenge in Library and Information Science Education*, American Library Association, Chicago, IL.

Zuber-Skerrit, O. (1993), "Improving learning and teaching through action learning and action research", *Higher Education Research and Development*, Vol. 12 No. 1, pp. 45-58.

Zyroff, E. (1996), "Cataloging is a prime number", *American Libraries*, Vol. 27, May, pp. 47-50.

The enterprise portal – is it knowledge management?

Marian Cloete and
Retha Snyman

The authors

Marian Cloete is a Post-Graduate Student and **Retha Snyman** is a Professor, both in the Department of Information Science, University of Pretoria, South Africa.

Keywords

Knowledge management, Computer software, Culture (sociology), Change management, Information society

Abstract

Currently we are in the middle of the information age, suffering from information overload on the one hand and a lack of knowledge on the other. Enterprise portals (EPs) are seen as the antidote to these problems by becoming more and more the ultimate knowledge management (KM) tool. The current hype about EPs is focused on their application as KM tools. Very little attention is given to other aspects of KM, namely the organisational, human and cultural aspects. The article will provide an overview of the technical and strategic relationship between EPs and KM and illustrate that EPs are only the technology component and should not be mistaken for the essence of KM. What is needed for successful KM in an organisation is not technology alone, but also a knowledge-sharing culture, knowledge-sharing policies, organisational processes, performance measurement and business strategies.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

Aslib Proceedings
Volume 55 · Number 4 · 2003 · pp. 234-242
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310486593

Introduction

We are currently finding ourselves in the middle of the information age, suffering from information anxiety caused by "infoglut". Research published by the management consulting firm KPMG in March 2000 found that 70 per cent of the companies surveyed claimed that they suffer from information overload despite implementing a variety of technologies such as corporate intranets and data warehouses. In spite of this apparent information overload, Gartner (Jacobs, 2002) claims that we are at the same time experiencing "infofamine", in terms of access to knowledge. In the average US company, 80 per cent of digitised information is stored in personal files on individual personal computers. Less than 5 per cent of employee knowledge is actually captured and accessible across the enterprise (Wells *et al.*, 2000).

More and more, enterprise portals (EPs) are being presented as the antidote to the infoglut and infofamine phenomena, and as the tool to revolutionise our access to information and knowledge. Portal technology has gripped the imagination of information technology (IT) users and vendors ever since the popularisation of the concept at the end of 1998 (Wells *et al.*, 2000). It is predicted that the growth of the portal market will be phenomenal.

In 1999 Gartner (Phifer, 1999) stated that:

> ... by 2001 the knowledge portal will become a standard component of successful knowledge management implementations.

This prediction is supported by the Meta Group (Cain, 1999), claiming that by 2002:

> [K]nowledge management collaboration and innovation will permeate the Global 2000 corporation's strategy. However, more than 90 per cent of the G2000 will recast knowledge management efforts as portals, delivering personalised, in-context information gathered through internal and external sources (Cain, 1999).

Ovum (Wells *et al.*, 2000) estimated that the total market for portal software would be worth almost $1b in 2000 and would grow to more than $7b by 2005. This kind of hype about portal software tends to hide the key message of the knowledge management (KM)

Received 21 December 2002
Revised 15 April 2003
Accepted 20 April 2003

movement that people, not technology, solve information and KM problems.

The aim of the article is to provide an overview of the relationship between KM and IT and between KM and EPs. More specifically, it will be illustrated that implementing an EP is not implementing KM; an EP is only an IT tool in the implementation of KM. To test this theory, a case study is used to describe the practical experiences of an organisation where an EP has been implemented. The case study will determine to what degree the particular EP was implemented as part of a KM strategy and which KM elements were involved in the implementation. Through the case study best practices will be identified for the implementation of an EP. Information for the case study was gathered through interviewing the knowledge manager at an IT consultancy.

The relationship between KM and technology

In trying to define KM, O'Dell and Grayston (1998) say:

> When explicitly managed, organisational knowledge is used to accomplish the organisation's mission. Knowledge management is therefore a conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that improve organisational performance ... it is a framework, a management mind-set ... (O'Dell and Grayston, 1998).

However, the term "knowledge management" can be an unfortunate term since it promises the painless planning, organising, directing and controlling of knowledge (which is unstructured), in the same way as is done with structured items. Therefore, for many managers, the term promises a simple IT solution that treats knowledge in the same way as information or data. Actually, in order to obtain leverage on the knowledge within organisations, what is needed is far more subtle and widespread – it amounts to a whole new way of organising and thinking (Widmayer, 2000).

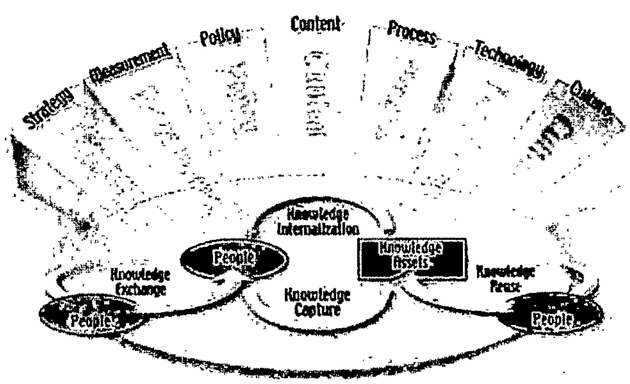
The elements that need to form part of KM can be illustrated by means of MITRE's model, which provides a holistic approach to KM – where KM is viewed from a two-dimensional perspective. The components of the model were derived from KM research performed in MITRE's technology program and a survey and comparison of KM models (e.g. Ernst & Young, APQC and DataWare) being used in industry or described in the literature (Taylor Small and Tatalias, 2000) (see Figure 1).

The first dimension consists of the activities that are critical for knowledge creation and innovation: knowledge exchange; knowledge capture; knowledge re-use; and knowledge internalisation. Collectively, these processes build a learning organisation skilled at creating, acquiring and transferring knowledge as well as adapting its actions to reflect new insight and innovation (Taylor Small and Tatalias, 2000).

The second dimension consists of those elements that enable or influence knowledge-creation activities. These include:

- *Strategy* – the alignment of corporate and KM strategies.
- *Measurement* – the measures and metrics captured to determine if KM improvement is occurring or if a benefit is being derived.
- *Policy* – the written policy or guidance that is provided by the organisation.
- *Content* – the corporate knowledge base that is captured electronically.
- *Process* – the processes that knowledge workers use to achieve the organisation's mission and goals.
- *Technology* – the IT that facilitates the identification, creation and diffusion of knowledge among organisational elements within and across enterprises, e.g. an EP.

Figure 1 MITRE's KM model



Source: Taylor Small and Tatalias (2000)

- *Culture* – the environment and context in which KM processes must occur (Taylor Small and Tatalias, 2000).

This model illustrates that technology is only one element of KM. In order to achieve successful and effective KM within the organisation, all the elements mentioned above should be present. KM is not the implementation of technology; rather, it is a multi-disciplined approach that integrates business strategy, cultural values and work processes. KM programmes perform best when enabled with sophisticated technology, but an emphasis on technology alone will achieve very little progress towards KM (Harris *et al.*, 1999a).

As early as 1997 Gartner (Bair *et al.*, 1997) predicted that, as KM matures into a megatrend, technology vendors will focus on the importance of technology, not cultural transformation. Vendor interests often preclude reminders that KM is complex and cannot be accomplished through technology alone.

The same is currently happening in the EP market. EPs are promoted as the "killer application" for KM and, through clever software vendor marketing, companies might be misled to think that implementing an EP is equal to implementing KM.

The relationship between KM and EPs

According to Shilakes and Tylman (1998) of Merrill Lynch's Enterprise Software Team:

> Enterprise Portals are applications that enable companies to unlock internally and externally stored information, and provide users a single gateway to personalised information needed to make informed business decisions.

It is interesting to note that some of the very first research published on the topic of portals refers to the term "knowledge portal", for instance a Gartner Research Note entitled: "The knowledge portal: adding knowledge to intranets", 30 December 1998 (Bair, 1998). It seems that right from the start, portals were connected to KM.

In current literature, the relationship between KM and EPs is described primarily as an IT relationship. For instance, Gartner claims:

> The overlap between current KM and EP technologies is not surprising since they share the same parentage – the Internet … .

Gartner continues to say that although KM has been promoted as a business management issue for more than 20 years, the Internet was the technology trigger that launched KM into worldwide adoption. EPs were also triggered by the Internet, as enterprises sought to replicate the Internet portal (e.g. Yahoo!) within the enterprise to unify information access and improve management of vast information resources (Harris *et al.*, 1999b).

Another aspect of the IT relationship is seen in the fact that EPs are the value proposition first used by groupware systems such as Lotus Notes, and more recently, corporate intranets – which are both recognised KM tools. For many, the portal approach merely seems like the natural evolution of intranets and groupware solutions into a common information infrastructure (*Computer Finance*, 2001; Watson, 2000).

Gartner (Harris *et al.*, 1999a) provides a checklist of KM technology requirements and identifies EP's overlap. In Table I the significant overlap between EP and KM technology requirements can be seen, making EPs recognised KM tools.

In addition to the technical similarities, there are also a few authors who regard the relationship between KM and EPs as being on a more strategic level. For instance, Meta Group says EPs are foremost a business strategy, not a technology endeavour, and that the core value of EPs is information dissemination. In a KM context, the EP's main role is to provide easy access to the shared services and knowledge resources that constitute a network-based corporate memory. For knowledge workers it provides a way to see and live in the corporate network (Cain, 1999; *Computer Finance*, 2001).

Wells *et al.* (2000) also regard the current hype around portal software and applications as interesting since portals were originally conceived to address the cognitive (not technical) problem of providing easier access to information, especially on the Internet. The spread of EPs promises to bring a sense of order to corporate information repositories similar to that which consumer Internet portals have brought to the World Wide Web. Wells *et al.* (2000) therefore see the relationship not as technical but as strategic;

Table I KM and EP technology overlap

Technology functionality	KM technology	EP technology
Capture and store	*	
Search and retrieve	*	*
Send critical information to employees	*	
Structure and navigate	*	*
Share and collaborate	*	
Synthesise	*	
Profile and personalise	*	*
Solve or recommend	*	
Integration with existing business applications	*	*
Maintenance	*	*

Source: Harris *et al.*, 1999a

KM and EPs share the same "intellectual" purpose, that of managing access to information and knowledge.

However, although KM and EP applications both have rich technology support for information management and human processes and share the same strategic objective, implementing an EP is not implementing KM. Organisations cannot achieve the implementation of a KM discipline with technology alone. EPs should therefore not be mistaken for the essence of KM (Harris *et al.*, 1999a).

EPs are not KM

EPs need to be implemented within a comprehensive KM strategy. Briggs (2000) says:

> A comprehensive KM strategy is the foundation – and the purpose – for a successful portal.

Companies should not confuse the tactical advantages offered by portals with the fundamental changes required for effective KM. The portal is the interface, the place where information exchange and knowledge transfer takes place, but it is only one component of successful KM (Ifrah, 2001).

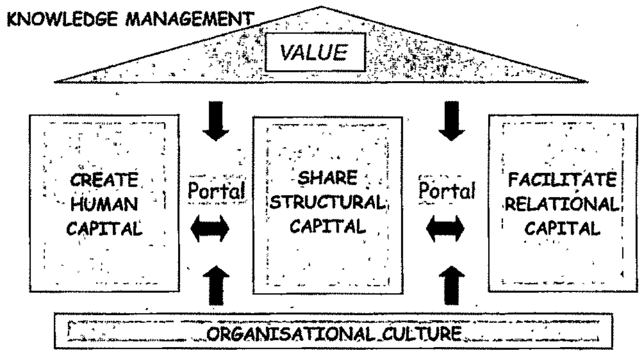
Louise Temkin (2001), Knowledge Operations Associate Director at Accenture, supports this view and illustrates the relationship between KM and EPs through a model adapted from the work of Karl-Erik Sveiby (1998) (see Figure 2). According to Temkin, the potential of an EP can be enhanced if it is seen to be an enabler of intellectual or knowledge capital management which is directly linked to the ultimate profitability or increased effectiveness of an organisation. The EP links the different silos of knowledge capital with each other as well as with the value proposition and organisational culture of the enterprise.

As is shown in Figure 2, KM facilitates the creation, capturing, organisation, accessing and use of an enterprise's knowledge capital, consisting of:

- *Human capital* – knowledge, skills, experience, talent, competencies, education, intelligence, innovation, creativity and problem-solving ability of the people that work within, or in partnership with, an organisation.
- *Structural capital* – systems, processes, methods, best practices, know-how, agreements, copyrights, patents, trade secrets, brands and techniques which get left behind when the employees leave.
- *Relational capital* – relationship with customers, suppliers and external organisations.

Value is created by personalising, aggregating and integrating the human, structural and relational capital. The value of KM should be

Figure 2 Model linking KM and the EP



unique and specific to every organisation and should be reflected in the bottom line. An organisational culture should be created that incorporates KM, including motivation, ability, performance, education, learning, training, trust, behaviour, values and beliefs (Morris, 1998; Sveiby, 1998; Temkin, 2001).

The EP facilitates human capital creation by consolidating, integrating, enhancing and connecting to the knowledge people have within an organisation. It enables structural capital to be shared, used, re-used, acquired, retained, identified, received, transmitted, applied and networked within an organisation. The EP facilitates, collaborates, updates, explores, interacts and promotes the image and the brand to customers, partners and interested parties (relational capital). An organisational culture should be created in which the portal is used. For this reason the portal strategy cannot be stand-alone, it must be incorporated into the organisational strategy for knowledge capital management (Temkin, 2001).

Case study

In order to test the theory, a case study will be described where an EP has been implemented in a global IT consultancy. Since the EP is seen as a KM tool, the basic components of a KM implementation as described in Figure 1 should be present.

Case study: information technology consultancy

The case study organisation is a global IT consultancy with 78,000 employees all of which have intranet access. The majority of the employees work at client sites or remotely from their local offices and depend on the organisation's intranet infrastructure to help them manage their administrative and knowledge related tasks.

In 2001, as part of its IT infrastructure strategy, this IT consultancy designed and developed an EP. The EP provides a global, single point of entry to the organisation's knowledge, information and tools, in order to assist its employees in their day-to-day tasks.

The company's KM efforts are initiated to leverage the knowledge capital of a large, global, multidisciplinary organisation. Knowledge sharing is at the core of the programme, and the relevant KM solutions are provided to capture and organise its collective knowledge assets. All employees practice KM in that they use the knowledge environment as a touch point to collaborate with experts, to access relevant knowledge, to speed up project work and to resolve issues. In addition, knowledge creation is emphasised in the expectation that all employees contribute their own experience and expertise to the collective knowledge base, and that they also utilise it to stimulate ideas for problem solutions, new services and new business.

The company's KM solutions were initially built on Lotus-based KM technology architecture, but it is gradually moving to increased browser-based access. The Web-based EP will eventually become the exclusive KM tool in the company. The design, development and implementation of the EP were driven by a project called "Project Navigator", which was jointly sponsored by the IT team and the Media & Entertainment industry group. The EP governance team included senior managers from all areas of the company, e.g. business architecture, IT, KM and the business and support units. The involvement of senior leadership provided executive sponsorship to reinforce the usage of the EP. The channel management team created "portal guiding principles" that were used in the design and development of the EP.

The EP was launched as a pilot during May 2001 and the official global launch to all company employees took place during July 2001, over a two-week period. The target audience for the initial launch of the EP was line consultants with the intent of making them more effective and efficient in delivering value to their clients.

The implementation of the EP was based on the framework depicted in Figure 3, with the key components being strategy, organisation/culture, measure, technology and content architecture. The heart of the model is helping the employee perform their business processes more effectively.

Phase 1 of the EP was an enhanced directory of available sites that was easy to navigate and which provided a sophisticated search engine that would assist users in accessing and browsing specific pieces of information. With the implementation of

Web publishing and content management, as part of Phase 2, the EP has been able to integrate a number of sites into its overall structure and has built robust channel structure to access pertinent information. In addition, it has a home page that can be customised by geography to deliver local information of interest.

The EP content includes: information on the company, knowledge capital (e.g. project deliverables) that is also available on Lotus Notes; news; learning and training available in the company; tools and services; travel information; and career and benefit information. Currently the EP contains the KM functionalities listed in Table II.

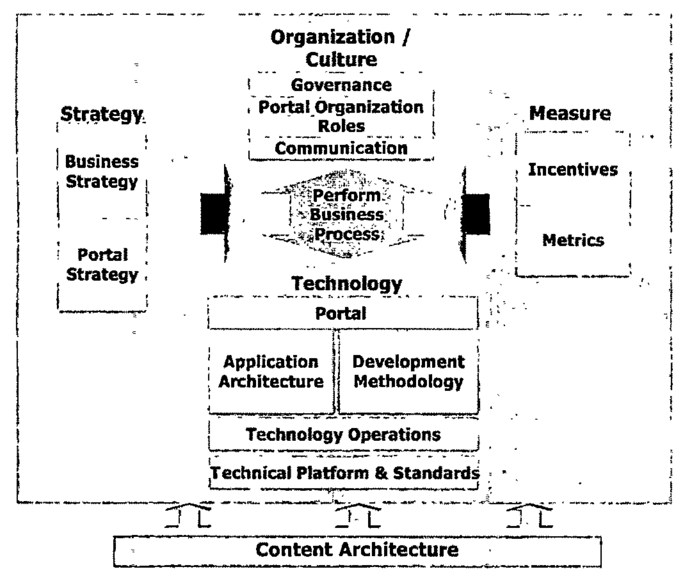
Future enhancements to the EP include: personalisation, upgrade of the technical infrastructure to include a content management platform, integration of basic transaction processing and further integration with other enterprise applications.

KM in the company is embedded within the human resource function. This means that, included in employees' performance evaluation, is the measurement of their contribution of knowledge capital to the Lotus Notes databases or EP.

Despite the strong KM culture in the firm, the uptake of the EP as the new KM tool is still relatively low. Some of the reasons include:

- Most important is the fact that the Lotus Notes databases still exist. Employees are more familiar with and aware of this tool and will continue using it until such time as Lotus Notes has been replaced by the EP.
- The EP is plagued by various technical problems including down-time and extremely slow connection time when working from client sites. Information contributed to the EP gets "lost" and there are still problems with the automatic updating of information from Lotus Notes to the EP.
- The ownership of the content on the EP is fragmented and there is a silo effect. This results in varying data quality; for instance certain databases have been transferred completely to the EP and others not. In the latter instances employees still need to refer to the Lotus Notes database to be able to access all available information.
- The silo effect is also emphasised by the fact that moving from one section in the EP to another requires a continued input of an employee's enterprise password.
- Contributing knowledge capital in the form of project deliverables, best practices, proposals, procedures, etc. to the EP needs to be done during a consultant's "spare time", since it is a non-billable task. These contributions therefore take a low priority in consultants' daily work, resulting in a loss of valuable knowledge capital.

Figure 3 EP framework



The success of the EP in this company will be measured in terms of the impact it makes on the bottom line, in other words the impact on the return on investment. In terms of the future of the EP, an announcement was made within the company that the EP would completely replace Lotus Notes during 2003, becoming the primary KM tool.

Case study – best practices

Although the EP discussed is in the early phases of implementation, certain best practices can already be identified in implementing EPs. Some of these best practices include:

- When determining scope, identify the key capabilities that will drive repeat usage.
- Build the site with the goal of creating a tool that is useful initially, and then add features and information to make it

Table II Consultancy EP's KM functionalities

KM functionality	Description of EP
Knowledge/information capturing	Knowledge capital can be contributed directly to the EP as of April 2002 through standardised templates. Contrib can be made by non-technical users
Expert system	The EP contains an "expert finder" functionality
Application integration	The EP integrates a large number of Lotus Notes databases as well as other company sites. Applications not yet integrated include, for instance, the performance evaluation tools and office-specific directories
Communities of practice	Employees can subscribe and participate in discussion forums
Personalisation	Limited personalisation, for instance the system recognises recurring users, and country preferences can be selecte
E-learning	Through the EP, employees can access the eLearning database, which contains all training available in the compa
Automatic update of content created through linked applications	Knowledge capital contributed to a database in Lotus Notes is updated automatically in the EP, and the other wa round
Browsing and full text searching	Full-text searching provides the ability to search dozens of company sites and databases at once. This was not previously possible in Lotus Notes. The EP has a standard interface and navigation scheme with logical organis and placement of content
Structured and unstructured information	Knowledge capital, especially in the form of human and structural capital, is captured on the EP, including best practices, client deliverables, processes created within projects, proposals, client presentations, etc. There exists logical organisation and placement of information

essential, so that it eventually becomes the user's workspace.
- Clearly understand the needs of the end-users upfront by conducting focus groups. Continue to drive decisions based on user input.
- Clearly establish the target audience initially; do not attempt to be all things to all people.
- Attempt to get executive sponsorship to reinforce the portal as the one portal recognised by leadership.
- Organisational and cultural issues to be addressed include data ownership and encouraging employees to share and contribute to the corporate data pool.
- Focus on incrementally adding communities rather than pursuing a big-bang approach for the whole organisation. Each community will require attention and specialisation that could make an all-at-once implementation daunting.

Conclusion

From the case study it is clear that EPs are unique and will differ according to the specific objectives and characteristics of an organisation. The nature and value of KM are also unique in different organisations, according to the type of knowledge capital available in the organisation, as was suggested in Figure 2.

Despite these differences, the theory highlighted the fact that implementing an EP requires a complete KM strategy, which will have the same basic elements regardless of the type of organisation. In order to determine the degree to which the implementation of the EP in the case study was done within a KM strategy, the EP will be evaluated against the basic elements identified in the KM model as described in Figure 1.

The first dimension of the model, consisting of knowledge creation and innovation activities, was present in the case study organisation with the focus on knowledge capture and the "codification" of knowledge. It appears that the more mature and established these basic KM activities are within an organisation, the more effective the EP will be in achieving the necessary objectives in terms of sharing and providing access to knowledge and information. It supports the theory that EPs are therefore not a substitute for poor KM. Successful KM will lead to a successful EP, not the other way around.

In terms of the second dimension of the model, consisting of those elements that enable the knowledge-creation activities, Table III summarises to what degree these elements were present in the case study organisation.

Two issues emerge from this evaluation. In the first place it is clear that there still exist huge differences in opinion in terms of what

Table III EP alignment with KM elements

KM element	Case study
Strategy	The EP was implemented as part of the organisation's IT strategy. In the organisation there is a clear alignment of the EP strategies with the objectives of the organisation; the EP supports the core business activities of the organisation. The EP strategy is aligned with the organisational KM strategy
Measurement	Benefits achieved through the EP, in terms of improved access to and sharing of organisational knowledge and information, will be determined informally in the organisation. On a more direct level the organisation will measure the use of their EP through employee performance evaluations
Policy	No formal or written policy exists for information and knowledge management through the EP in the organisation. However, the organisation has adopted and communicated this information sharing policy on a high level to employees
Content	It seems that the majority of KM initiatives in the organisation revolve around identifying, classifying and indexing structured knowledge and information on the EP. There is a strong drive to capture human and structural capital on the EP (see Figure 2)
Process	The EP in the organisation is in the process of creating a technology environment where processes to achieve the organisation's objectives will be automated and where knowledge and information collaboration will be supported. However, as was mentioned in the second "best practice", the EP in the organisation is currently useful, but it is not yet at a level where it is regarded as essential – employees do not yet "live" in the EP
Culture	In the organisation there is very limited time and energy spent on creating and promoting a KM culture, in order to encourage knowledge, information sharing and collaboration across and among employees/business units through the EP. Since the EP is in the early stages of implementation and rollout, the focus is currently on technology and design issues

an EP could or should be. The strong link between KM and EPs as found in the literature is also not necessarily seen in practice. At these early stages it seems that organisations use EPs as content and information management tools, and only to a limited extent as true KM tools.

In the second place, and following from the above, it is clear that the focus is on the EP technology and the design and development of the tool. There are limited concrete processes in place to create a culture where employees are encouraged and supported to share and re-use knowledge, in general and through the EP.

In conclusion, organisations that adopt EPs as KM tools should take account of all elements of KM, including human processes and culture; otherwise they will eventually find that they are effectively "all dressed up with nowhere to go" – they have a "knowledge repository" that decays through disuse.

References

Bair, J. (1998), *The Knowledge Portal: Adding Knowledge to Intranets*, Gartner, T-06-2507, available at: www.gartner.com

Bair, J., Fenn, J., Hunter, R. and Bosik, D. (1997), *Foundations for Enterprise Knowledge Management*, Gartner, R-400-105, available at: www.gartner.com

Briggs, D. (2000), "Maximizing the knowledge asset value within the enterprise", *DM Direct*, available at: www.dmreview.com/master.cfm?NavID=198&EdID=2146 (accessed 10 April 2002).

Cain, M. (1999), *Enterprise Portals: A Publishing Mode*, Meta Group, Workgroup Computing Strategies, Delta File no. 837, available at: www.metagroup.com/cgi-bin/inetcgi/jsp/displayArticle.do?oid=14411

Computer Finance (2001), "Key drivers for portal adoption", *Computer Finance*, Vol. 11 No. 10, pp. 1-9.

Harris, K., Phifer, G. and Hayward, S. (1999b), *The Enterprise Portal: Is It Knowledge Management?*, Gartner, SPA-08-8978, available at: www.gartner.com

Harris, K., Fleming, M., Hunter, R., Rosser, B. and Cushman, A. (1999a), *The Knowledge Management Scenario: Trends and Directions for 1998-2003*, Gartner, R-07-7706, available at: www.gartner.com

Ifrah, E. (2001), "Corporate portals require complete KM strategies", *KMWorld*, available at: www.kmworld.com/publications/whitepapers/portals/ennov.htm (accessed 3 March 2002).

Jacobs, J. (2002), *Case Studies: KM in the Real World*, Gartner, ITSV-WW-PR-0125, available at: www.gartner.com

Morris, H. (1998), "Three waves of information portals for knowledge management", *KMWorld*, Vol. 7 No. 1, available at: www.kmworld.com/publications/magazine/index.cfm?action=readarticle&article (accessed 22 August 2001).

O'Dell, C. and Grayston, C.J. (1998), *If Only We Knew What We Know: The Transfer of Internal Knowledge and Best Practice*, The Free Press, New York, NY.

Phifer, G. (1999), *Enterprise Management Alert: A Winning e-Business Strategy*, Gartner, IGG:IGG-10131999, available at: www.gartner.com

Shilakes, C.C. and Tylman, J. (1998), *Enterprise Information Portals*, Merrill Lynch, as quoted by

Joseph Firestone, available at: www.dkms.com/EIPDF.html (accessed 6 April 2002).

Sveiby, K.-E. (1998), "The invisible balance sheet", available at: www.sveiby.com/articles/IntangAss/denosynl.htm (accessed 25 September 2002).

Taylor Small, C. and Tatalias, J. (2000), "Knowledge management model guides KM process", *The Edge Newsletter*, available at: www.mitre.org/pubs/edge/april_00.htm (accessed 7 April 2002).

Temkin, L. (2001), "Knowledge operations accenture", Interview.

Watson, J. (2000), "Understanding portals and KM", *Information Management Journal*, Vol. 34 No. 3, pp. 18-22.

Wells, D., Sheina, M. and Harris-Jones, C. (2000), *Enterprise Portals: New Strategies for Information Delivery*, Ovum, available at: www.ovum.com

Widmayer, K. (2000), "Enterprise information portals and knowledge management", *International Knowledge Management*, ITRN 701, Section 7, available at: www.metakm.com/print.php?sid=265 (accessed 6 April 2002).

Seeding a community of interest: the experience of the knowledge library project

Andrew Cox
Keith Patrick and
Rahman Abdullah

The authors

Andrew Cox is based in the Department of Information Science, Loughborough University, Loughborough, UK. **Keith Patrick** is based in Westminster Business School, University of Westminster, London, UK. **Rahman Abdullah** was formerly in LITC at South Bank University, London, UK.

Keywords

Virtual organization, Knowledge management, Libraries, Librarians

Abstract

The paper reports on the early lessons learned in the process of forming an online community for librarians from different organisations and sectors to discuss knowledge management. Time, critical mass, diversity of membership, focus, information and communication technology, incentives, concepts of membership, services and leadership were all factors in the slow coalescing of the group as an active self-sustaining network.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 4 · 2003 · pp. 243-252
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310486601

Introduction

Knowledge management (KM) as an identifiable area of study and practice is often thought to have first emerged in 1995 with Nonaka and Takeuchi's *The Knowledge Creating Company*, although earlier references to the "knowledge worker" can be traced to Peter Drucker (1983):

> To make knowledge work productive is the great management task of this century; just as to make manual work productive was the great management task of the last century.

In some sectors, KM has been adopted quickly and with enthusiasm, in consultancy firms (applying it to themselves, then selling it as a service), energy (oil and gas) and pharmaceuticals in particular. Take up has been slower in the public sector, although its use is on the increase in government departments in both the UK and Australia. The latter two countries, independently, are at the forefront of seeking to create standards and guidelines (Kelleher and Levene, 2001).

KM is inherently cross disciplinary and cross professional, with implications for line management but also computing, human resource and library professionals. The starting point of the knowledge library (KLibrary) project was the reflection that KM has been taken up very differently in different library sectors, and that this should be explored.

KM authors sometimes see librarians as key brokers of knowledge sharing. Davenport and Prusak (1998), for example, recognise the possibility that librarians' knowledge of who is researching what enables them to connect people in different parts of the organisation, often in unexpected ways (Davenport and Prusak, 1998, pp. 29-30). Generally, though, most library work would be seen by KM as primarily in the realm of managing explicit knowledge (which is assumed to be well understood) rather than the management of intangible, tacit knowledge which is often the focus of KM interest.

Received 27 November 2002
Revised 9 January 2003
Accepted 10 February 2003
This project was facilitated by Research Development funding from South Bank University, London. Andrew Cox was formerly in the LITC at South Bank University, London. Keith Patrick was formerly in SCISM at South Bank University, London.

In turn, knowledge management has had a mixed reception from the information profession. By reputation KM has been quickly adopted in commercial operations and law firms, and in some of these cases the library has been heavily involved. Despite the strong advocacy of KM in the profession by professional bodies such as the Library Association, now CILIP (Field, 2002), in most library sectors there has been little take up of KM to date.

Some in libraries have been critical of the whole idea as a mere management fad (e.g. Bawden, 1998). Those aspects of KM close to information management have been criticised as ill informed attempts to reinvent library knowledge about controlled vocabulary and metadata. They have also been perceived as no more than a return to a focus on organisational skills inventories and expertise databases, an emphasis that has never been lost in special libraries (Streatfield and Wilson, 1999). KM technologies so often turn out to be reapplications of indexing and portal technology that it is easy to dismiss KM as a rebranding exercise. The impact of KM is further obscured by KM itself being a notably fuzzy concept.

Again, in some settings where KM is on the institutional political agenda, it seems that appropriating the term "knowledge" is merely a resource winning strategy. For example, to a certain extent in the health field the mantra "access to the knowledge base" can just mean access to Medline. In a context where the loosely defined term knowledge has become a government declared priority it is good in itself that it is being used to boost the perceived value of traditional information assets, but this is not to connect library practice and theory and KM.

Again there is interest among academic librarians in KM concepts, but not much evidence of use of KM terminology in practice or in the literature. This may be because the scholarly community is already the model of a knowledge orientated society, but it is surprising that more of the terminology of KM has not percolated into day-to-day practice in university libraries.

This may be just a matter of terminology. Many existing library practices can be seen as KM, for example people finders/yellow pages/expertise databases or SDI services. In that sense librarianship teaches some forms of KM already.

Research approach

The Knowledge Library Project started from the premise that it would be useful to assemble a group of librarians from across the library sectors to share their understanding of the concept of KM, and to look at how some of the ideas from the rich literature of KM are, or could be, applied to library practice. For the project, two particular notions in the KM literature were identified that did not seem to be well understood by librarians, and which could be the focus for thinking about how to expand library theory and practice: community building; and storytelling.

It was considered that the most suitable research approach for the project to adopt would be that of action research. This was because the project was both about understanding and establishing the potential role of KM for librarians and also encouraging its use. Action research involves collaboration between the researcher and practitioner, with the aim of bringing about a change in a particular situation, to effect some improvement, in this case to increase awareness and knowledge of KM. The project team determined also to use an Action Learning approach, as it was intended to take learning from the face-to-face participatory seminars into shaping the details of the online phase of the project. Action Learning is where "... work and learning occur simultaneously" (Weinstein, 1995), with activity addressing work-based issues, e.g. applying KM in the librarians'/information professionals' working situation. However, with the benefit of hindsight it is possible that a journey-making (Eden and Ackerman, 2001) approach would have proved to be more suitable, enabling more active and extensive action learning.

Community

Though a rather inflated term for which social network could be substituted, community is a core notion in KM. Kim (2000), defines an online community as:

> ... a group of people with a common purpose, interest, or activity, who get to know each other better over time.

In KM communities are important as groups of people who share ideas and insights, help each other solve problems and develop a common practice or approach. They are not a new kind of organisational unit; rather, the stress on community represents a new discovery of the value of relatively informal interactions.

Communities are significant forces for the sharing of knowledge within organisations, and between individuals and groups.

At the heart of all communities can be found "social capital", which Putnam (1995) described as the:

> ... features of social organisations such as networks, norms, and social trust that facilitate co-ordination and co-operation for mutual benefit.

For Lesser (2000) it can be seen:

> ... as the wealth (or benefit) that exists because of an individual's social relationships ...

and Prusak (2000) the:

> ... value that accrues to an individual or organisation through who they know and how they use it (*sic*).

Cohen and Prusak (2001) in reviewing the many definitions concluded that:

> Social capital consists of the stock of active connections amongst people: the trust, mutual understanding, and shared values and behaviours that bind the members of human networks and communities and make co-operative action possible.

Types of online community

The different types of online community can be broken down by the purpose, and shared characteristics of their members:

- *Communities of practice (also known as CoPs)* – where individuals share the same profession, such as AccountingWEB, an online community for accountants.
- *Communities of circumstance* – where individuals share a personal situation such as Square Canary, a community for people who work in and around Canary Wharf in the City of London.
- *Communities of purpose* – where individuals share a common objective or purpose, such as KnowledgeBoard, a community to define knowledge management "made in Europe".
- *Communities of interest* – where individuals share an interest, such as UK-Dance a community for people interested in dance music in the UK.

Sometimes a community may fall into more than one definition, and over time a community may develop sub-communities formed around special interest groups (Baxter, 2002). There is also a new generation of corporate communities emerging, as companies are recognising the power of community to strengthen internal and external relationships (Baxter, 2002).

In their latest work, Wenger *et al.* (2002) see a librarian role in a community of practice. If such communities are the key to knowledge creation and transfer, the library profession may be ambitious to increase its skill set to become the natural manager of community. The challenges are in fact exactly those the profession has faced in trying to persuade people to use intranets. And it is evident from job adverts that there is an emergent professional group of community moderators or facilitators who might find a home within the professional society of librarians, CILIP. At the very least it would be useful to identify more clearly the role of librarians in educational communities of practice, for example. At the same time it was our perception from library-orientated lists that they were heavily orientated towards information exchange and that discussion is muted. This could reflect a rational response to the limitations of e-mail as a medium for discussion. But it could be that core professional values inhibit a stress on discussion and debate, thus weakening their claim to be natural leaders in community building.

Community was also thought to be a good subject to discuss in the project since participants and researchers could reflect directly on their immediate experience of the project community itself, reinforcing the KM principle of active learning.

Storytelling/narrative

The other KM concept that was felt it would be useful to explore in the project was storytelling, also referred to as narrative. Cohan and Shires (1988) state that "a narrative recounts a story, a series of events in a temporal sequence" and suggest that "stories structure the meaning by which a culture lives". It could take the form of a line manager (storyteller) giving advice to a trainee (listener) or simply of colleagues talking during coffee breaks (Kelleher and Levene, 2001). Storytelling is, primarily, a tool used in cultural change.

A number of authors, including Snowden (2000) of IBM and the IKM, Denning (2000), World Bank, and Gabriel (2000), have, based on their consulting practice, suggested that storytelling is an effective mechanism for transferring tacit knowledge and introducing innovation. They claim that storytelling can be used for organisational culture analysis, introduction of change/innovation, behaviour reengineering, etc. – in essence storytelling as a knowledge disclosure mechanism. Stories are a powerful communication tool that can evoke visual image and emotion, whilst at the same time allowing information and knowledge shared to become more realistic and easy to accept (Morgan and Dennehy, 1997).

> Nothing serves a leader better than a knack for narrative. Stories anoint role models, impart values, and show how to execute indescribably complex tasks (Stewart, 1998).

Storytelling represents an "old skill in a new context" (Snowden, 2000). Narrative and story act as a form of knowledge holder in its representation of events, this can be in varied forms: oral; written; film/video; or even graphic (pictures and maps). Narratives and stories can be seen to provide a bridge between the notions of tacit and the explicit knowledge, allowing the demonstration and sharing.

> Story provides a simple agent through which we can communicate complex meaning (Snowden, 1999).

In fact, storytelling complements community building (Wenger, 2001) in promoting organisational sharing, continuous learning (Morgan and Dennehy, 1997), cultural changes (Jordan, 1996) and above all the recognition of people within the organisation. Denning (2000) suggests that storytelling is a collective process. Some of the first writing about communities of practice saw storytelling as one of its key defining attributes (Brown and Diguid, 1991).

Knowledge Library Project

The object of the project was to begin to do the early work in forming a network of librarians interested in KM. The network would be a place to learn more about KM from South Bank University and guest experts but increasingly from other group members. The creation of a small community in the project itself would offer immediate practical experience of being involved in such a network, and planned joint storytelling activities were organized. The researchers wanted members to reflect on their practice to see how far KM concepts could clarify things they already did, or contribute to the widening of their skills.

Within the brief time scale of the funded project (eight months) it was only likely to be possible to dig the ground and sow the seed. Community building is a long-term process and it was expected to take the group only to the point of "coalescing" as a group (Wenger *et al.*, 2002, p. 69). The purpose of the project was to make such a beginning, with further work linked to other KM initiatives by the researchers.

Participants

Around 20 participants from special, law, academic and health libraries volunteered to join the group in response to direct invitation and invitations on a small number of discussion lists.

An initial survey established that the participants had a very wide variety of views of knowledge, but most (15/16) saw knowledge as very important to their organisation and a key responsibility for them as individuals (16/16). They were much more divided about whether their organisation was good at sharing knowledge (six said yes).

Seminar phase

Over the next three months the project team organised three workshops to introduce the members to the team and each other, and to reinforce briefing papers published on the project Web site.

The first meeting was centred around a series of talks from South Bank University's School of Computing, Information Systems, and Mathematics (SCISM) on aspects of KM, with associated exercises and discussion[1]. It was difficult to gauge the level of these talks, given participants' different backgrounds and levels of prior knowledge. The project team's immediate feeling after the session was that they had not done enough to create a sense of commonalty between the members, and that they had reinforced a sense that it was a course on KM, whereas they wanted to stress learning from each other and reflection on existing practice. In partial response to this a Jiscmail discussion list was created, as an outlet for participants to continue to talk to each other between the workshops.

The second seminar was much more discussion based, and organised around a series of reflective exercises. The first asked participants to reflect on:

- What were they actually sharing and whether it represents information or knowledge?
- What is the form of this sharing, i.e. document, conversation, or recommendation?
- How is it facilitated, i.e. person to person, or via technology?

The second exercise was to look at what barriers they have encountered, and how they have or could be overcome. The third focused down on thinking about their own experience of online communities, and how useful it had been for them.

Reviewing these discussions, the project team felt that there was a strong sense that knowledge practice is in many ways closely linked to library practice. But there was a strong anti-technology feeling in the group, slightly surprising given the success of the library profession at adapting to the opportunities created by the Internet, for example.

Between the second and third workshops the research team evaluated a number of software tools for community building. As part of the process the participants in the project were asked themselves to rank different software functions for potential value. Real time chat was rated low. The discussion area was seen as the most valuable, along with the directory of members. The tool devised to evaluate available software systems is to be published separately.

The third seminar started with a demonstration of the chosen system, intranets.com, supported by a manual written by the project research associate (RA) followed by an opportunity to try the system, by navigating through sections and posting messages. The second part of the session was a storytelling workshop led by Selina Shah, Senior Knowledge Management Officer, The Arts Council. Participants, who were initially dubious, seemed captivated by the idea and joined in the storytelling exercises with enthusiasm. Props were provided (such as coloured pens, coloured dough, scissors, hats) and books were utilised, and participants were getting to grips with presenting their individual stories. However, it was apparent that for this technique to work it would require a lot of skills and confidence on the part of the storyteller. Language, communication and listening were some of the skills identified. This was seen as one of the initial barriers for participants to apply this technique to their own settings; however, people were keen to try it out. The project team was also keen to transfer what was learnt from the workshop to the online community.

Materials from the workshops can be found on the project Web site at (see Figure 1) http://www.litc.sbu.ac.uk/klibrary

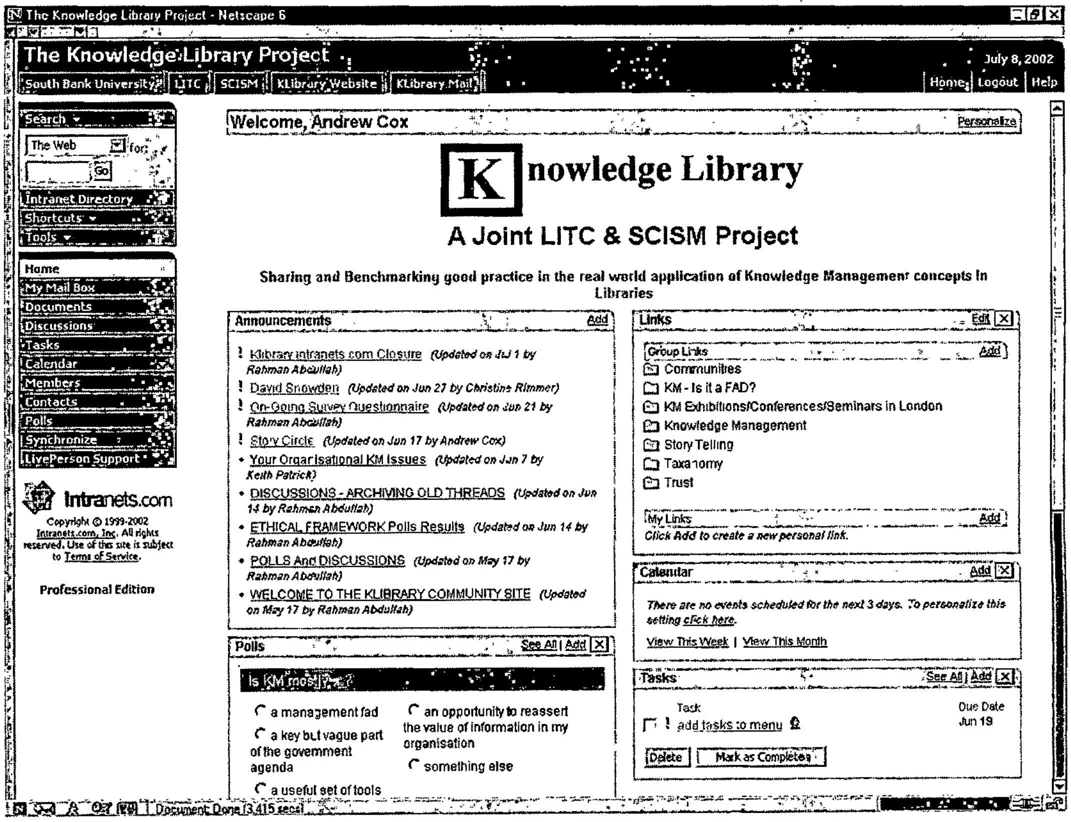
Online phase

After the third workshop communication was to be through an online system. The software chosen had the following functions: ability of administrators to make announcements, all members to start discussions and post to discussions, ability for all members to start and vote in a poll, ability of all to add links or documents, ability of all members to add events and tasks with reminders to a calendar, ability of individuals to create a membership directory entry for themselves from a structured template.

The online community system was run for three months. In retrospect, activity fell into two periods. In the first period, the link and document stores on the site were primed with content. A number of discussions were initiated, and the team tried out a range of type of postings, from questions to posting pieces of text, to see which would be most successful in eliciting a response. The alert capability was used to send mails to announce and encourage participation. A series of polls were conducted on attitudes such as how to define membership of a community and on issues such as whether guest members should be allowed to join. The community as a whole voted not to open the site up to non-members.

By the end of the period most of the members had registered on the system. But only one thread of discussion had been started by members other than the project team. Only a handful of members ever posted a question or answer. Most log ons were stimulated by an alert sent out by the team.

Figure 1 Knowledge library Web site



Welcome, Andrew Cox

Knowledge Library

A Joint LITC & SCISM Project

Sharing and Benchmarking good practice in the real world application of Knowledge Management concepts in Libraries

Copyright © 1999-2002 Intranets.com, Inc. All rights reserved. Use of this site is subject to Terms of Service.

Announcements

! Klibrary intranets.com Closure *(Updated on Jul 1 by Rahman Abdullah)*
! David Snowden *(Updated on Jun 27 by Christine Rimmer)*
! On-Going Survey Questionnaire *(Updated on Jun 21 by Rahman Abdullah)*
! Story Circle *(Updated on Jun 17 by Andrew Cox)*
- Your Organisational KM Issues *(Updated on Jun 7 by Keith Patrick)*
- DISCUSSIONS - ARCHIVING OLD THREADS *(Updated on Jun 14 by Rahman Abdullah)*
- ETHICAL FRAMEWORK Polls Results *(Updated on Jun 14 by Rahman Abdullah)*
- POLLS And DISCUSSIONS *(Updated on May 17 by Rahman Abdullah)*
- WELCOME TO THE KLIBRARY COMMUNITY SITE *(Updated on May 17 by Rahman Abdullah)*

Polls

Is KM mostly...?

○ a management fad
○ a key but vague part of the government agenda
○ a useful set of tools
○ an opportunity to reassert the value of information in my organisation
○ something else

Links

Group Links
Communities
KM - Is it a FAD?
KM Exhibitions/Conferences/Seminars in London
Knowledge Management
Story Telling
Taxonomy
Trust

My Links
Click Add to create a new personal link.

Calendar

There are no events scheduled for the next 3 days. To personalize this setting click here.

View This Week | View This Month

Tasks

	Task	Due Date
☐ !	add tasks to menu	Jun 19

The project team left the site alone for a quiet period to see if inactivity would stimulate a more active response from the participants. This did not happen.

In the second period, after about six weeks, the researchers tried to focus activity by archiving past discussions and creating a limited number of new discussion areas (even though this risked reinforcing the idea that the researchers were "in control").

The four areas were:

(1) Own issues area – where people were invited to send specific issues for discussion.
(2) The klibrary story – this was a chain storytelling exercise. The team first composed and then posted the end of the story to the site. Members were asked to take turns to write episodes, each contributing 100 words, nominating the next person in the chain. The purpose of the exercise was to exploit evident interest in storytelling to enhance participation, and it was thought that a story would give a structure to contributions. The element of fiction would allow a little latitude to express opinion without being seen to comment in a public way about their own situation. The story would also help to create a natural rhythm to the community (Wenger, 2001, p. 48).
(3) Evaluation of software – an area to discuss how well the technology worked.
(4) A "tea room" for other discussions.

Although some personal issues were presented, and six episodes of the story written, activity from the members continued to be disappointing. Though they continued to log on, they did not post messages or resources to the site. Having reached the end of the funded period of the project, the researchers assessed progress to date and set out the strategy for continuing the initiative.

Reflections on the knowledge library experience

In Lave and Wenger (1991) a community of practice is an intangible abstraction from social relations, from how people naturally behave. But increasingly, among later writers, it becomes a thing which can be created and managed, a CoP. This divergence reflects a tension between sensitive explorations of how organisations really work, and a desire to derive a management formula (perhaps to sell consultancy and books). In fact the idea of managing knowledge is itself increasingly a deprecated notion (e.g. Streatfield and Wilson, 1999, p. 70). Knowledge is too intangible and subtle to be managed like cans in a production line or books on a shelf. It is evident then that an attempt to create a community, especially in a short time scale, was always likely to be difficult.

It would be fair to acknowledge that gaining active participation from the members of the knowledge library project was even more difficult than had been expected. Early activity within the online environment was slow and grudging, and showed little sign of having a life of its own. Having identified personal space in the membership directory as a key function, few put in anything more than minimal contact details – even though this had been discussed in one of the seminars. Only the project team uploaded photographs of themselves. No one uploaded links or documents apart from the project team. Communication on the discussion list was dominated by the researchers. This is a common experience in online communities judging from most archives. The literature had already indicated to us that it would be a slow process.

Reflecting on three months of experience, the project After Action Review identified a number of key issues:

- *Time*. Any sort of community needs time to build up its own life and momentum.
- *Critical mass*. The membership was quite small at only around 16, and given that participation rates in online discussions always tend to be low, the project did not give a critical mass of people to generate continuous activity and interest. A small group had been chosen because it was felt it would work best in the early face-to-face seminars. Once the online community was launched the preference seemed to be for larger numbers. There was a discontinuity here.
- *Diversity of membership*. The members chosen for the group did not know each other before the first meeting, and worked for different organisations in different library sectors. So it was a very diverse group and it was always likely to be difficult to overcome the feeling that they had little in common. Given that in the literature communities are normally created from people within one organisation, the project had added another level of difficulty to the community building process. There was also a considerable variation in participants' baseline knowledge of KM concepts. The project team felt that this was acceptable because it was expected that those with more experience would provide some leadership, and because, in fact, much of common library practice could be read or discussed as KM once the terminology was understood.
- *Focus*. It is possible that the project team had not given the community a narrow enough or clear enough focus. In the early seminar it was felt necessary to give everyone a basic grounding in KM concepts, in quite a wide-ranging way. This may have dissatisfied some who already knew much about KM, but it also unfocused the purpose of the community. It reinforced any misconception that it was a short course on KM, rather than an attempt to get librarians to reflect on their own practice.
- *ICT*. The use of ICT in the project was appealing, because it made the community building process potentially reusable and inherently scaleable. In fact many of the members expressed quite deep resistance to the use of ICT during seminar two. This is surprising among members of a profession that has been relatively quick in adopting ICT. It may partly reflect the idea that posting something on the Web is a form of publication and participants were concerned about their expertise to do so. For the law librarians there were issues of confidentiality. It is obvious that face-to-face contact is much more successful in creating a deeper sense of trust; there needed to be more face-to-face contact.
- *Incentives*. Although the researchers did ask respondents to agree informally to offer a total of 24 hours of their time to the project during its course, there was no way to enforce this. It is possible that the participation would have been much greater if the participants' employing organisations had been asked to make a formal commitment. There was little the team could do to incentivise participation, except by making it an inherently rewarding experience.

- *Services*. The literature shows that it is most effective to build community by attracting people to use a set of subject based services then to build up discussion among the people who use the service, rather than start with discussion. Members of the Knowledge Library Project said that the documents put on the Web site were the second most valuable part of the site. The research team did not at first see this as a priority, and focussed rather heavily on discussion.
- *Concepts of membership*. One of the polls conducted during the research produced the surprising conclusion that participants conceived of membership as merely signing up to the software system, not logging on, let alone posting to discussions. This, very passive, view of membership could possibly reflect typical attitudes and values among librarians. Many librarian discussion lists are busy but primarily informational, with relatively little discussion. The lists are essentially "information neighbourhoods" (Burnett, 2000) that are used to browse for information over time. A core perspective in KM is that investing time in informal relationships and discussions has long term value to the organisation. Some organisations, as part of their KM commitment, have offered staff a percentage of time to work on their own projects, in the belief that this time will bear fruit in improved work performance in the long run. Many organisations continue to impose close control on how time is used.
- *Technology blocks*. The technology relied on users logging on to a Web site, whereas the simpler model of pushed e-mails requires less effort to gain participation. In a sense, this was the major weakness of the technology chosen. The best response received was to alerts from the system, which went out as e-mails reminding people to log on because something had occurred. At the same time, although this elicited a response, members seem to have found the alerts irritating. So, if everything in the community had been conducted through pushed e-mails, participants might have taken more interest, but equally they might have been irritated by the interruptions frequent e-mails represent.

There were other small weaknesses in the software such as that the alerts of new material were expired too quickly. Logging of activity was inadequate to show how the site was being used. It was not possible to link documents or links and discussion areas. The supplier withdrew the instant chat facility between the time of the project evaluating the software and the subscription going live. Overall, though, the weaknesses in the software were not a factor in the low activity in the community.

- *Leadership*. In a sense the group had been given too much leadership by the project team. There had not been the space or time for shared interests to emerge naturally. On the other hand, it could be equally argued that the team should have done a lot more behind the scenes to coax members to post to the list. There is a sub-conscious assumption that this is somehow "cheating", but directly requesting input from individuals is arguably more than legitimate, it is essential (McDermott, 2000).
- *Differentiation of roles of project team*. It would have been useful to differentiate the three project researchers much more clearly so that the researchers themselves could continue to play out different roles within the discussions. Anonymous or pseudonymous accounts might have been used to increase the sense of diversity and activity in the discussion areas.
- *Surveillance*. Because it was a project, it is possible that participants felt under surveillance, which inhibited natural participation. One way around this might have been to offer the opportunity to make anonymous contributions.
- *The results of the exit survey of participants were far from negative*. The Web site had been quite heavily used. Everyone had at least registered for the site and most had logged on. One had logged on as many as 30 times. Opinion polls had received a good response.

In conclusion, the researchers decided to continue in the next part of the project to:

1. Expand membership of the group, in the first instance allowing anyone from a participating institution to join. Then anyone from an open meeting on communities jointly organised with CILIP at KMEurope.

(2) To use the simpler push jiscmail technology, supplemented with material on the Web site, polls (which have proved to be a successful feature of the current system) from a third party service and with an anonymous log in.
(3) Plan some simple services (a monthly e-mail newsletter with annotated links) to attract more members and focus discussions.
(4) Tighten the subject focus of the community, to simply community building. "KLibrary will be a discussion about how librarians can help to build workplace communities".
(5) Offer continuing face-to-face sessions, where possible in the context of joint events.
(6) Reform the "constitution" of the group by explicitly passing joint leadership to other members.

Conclusion

Parts of the library community have been rather slow to take up KM ideas, yet many of the existing activities of librarians could be understood in KM terms or be reapplied from information management to manage knowledge. In government and the health sector the agenda is shifting to stress the term knowledge. TFPL research has already shown how IM skills fit with KM and where the librarian's skill sets have to be expanded to capture this opportunity for the profession (TFPL, 2000). Morris has found that employers are seeking LIS professionals for KM posts (cited in Mendelsohn, 2001). Community building is a particular area of growth. Storytelling is an important concept that could enrich the practice of librarianship.

Note

1 SCISM have been running a practitioner MSc in Knowledge Management Systems since 2000.

References

Bawden, D. (1998), "Knowledge management – old solutions for new problems?", *Assignation*, Vol. 16 No. 1, pp. 10-12.

Baxter, H. (2002), *An Introduction to Online Communities*, available at: www.sift.co.uk/practice/white-papers/hb_oc.pdf (accessed 6 November 2002).

Brown, S.J. and Duguid, P. (1991), "Organizational learning and communities-of-practice", *Organization Science*, Vol. 2 No. 1, pp. 40-57.

Burnett, G. (2000), "Information exchange in virtual communities: a typology", *Information Research*, Vol. 5 No. 4, available at: InformationR.net/ir/5-4/paper82.html (accessed 6 November 2002).

Cohan, S. and Shires, L.M. (1988), *Telling Stories – A Theoretical Analysis of Narrative Fiction*, Routledge, London.

Cohen, D. and Prusak, L. (2001), *In Good Company: How Social Capital Makes Organisations Work*, Harvard Business School Press, Boston, MA.

Davenport, T.H. and Prusak, L. (1998), *Working Knowledge*, Harvard Business School Press, Boston, MA.

Denning, S. (2000), *The Springboard – How Storytelling Ignites Action in Knowledge-era Organizations*, Butterworth-Heinemann, Oxford.

Drucker, P. (1993), *Post-capitalist Society*, Butterworth-Heinemann, Oxford.

Easterby-Smith, M., Thorpe, R. and Lowe, A. (1997), *Management Research: An Introduction*, Sage, London.

Eden, C. and Ackerman, F. (2001), *Making Strategy: The Journey of Strategic Management*, Sage, London.

Field, M. (2002), *The History of Knowledge Management at The Library Association*, available at: www.la-hq.org.uk/directory/prof_issues/km.html (accessed 28 June 2002).

Gabriel, Y. (2000), *Storytelling in Organizations: Facts, Fictions, and Fantasies*, Oxford University Press, Oxford.

intranets.com, available at: www.intranets.com/ (accessed 31 July 2002).

Jordan, A.T. (1996), "Critical incident story creation and culture formation in a self-directed work team", *Journal of Organizational Change Management*, Vol. 9 No. 5, pp. 27-35.

Kelleher, D. and Levene, S. (2001), *Knowledge Management: A Guide to Good Practice, PAS 2001*, British Standards Institution, London.

Kim, A.J. (2000), *Community Building on the Web*, Peachpit Press, Berkeley, CA.

Koenig, M.E.D. (2002), "The third stage of KM emerge", *KMWorld*, Vol. 11 No. 3, pp. 20-1, 28.

Lave, J. and Wenger, E. (1991), *Situated Learning: Legitimate Peripheral Participation*, Cambridge University Press, Cambridge.

Lesser, E.L. (Ed.) (2000), *Knowledge and Social Capital: Foundations and Applications*, Butterworth-Heinemann, Oxford/Boston, MA.

McDermott, R. (2000), *Knowing in Community*, available at: www.co-i-l.com/coil/knowledge-garden/cop/knowing.shtml (accessed 28 June 2002).

Mendelsohn, S. (2001), "Time to move off the shelf", *Knowledge Management Magazine*, 28 June, pp. 10-12.

Morgan, S. and Dennehy, R.F. (1997), "The power of organizational storytelling: a management development perspective", *Journal of Management Development*, Vol. 16 No. 7, pp. 494-501.

Nonaka, I. and Takeuchi, H. (1995), *The Knowledge-creating Company – How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press, Oxford.

Prusak, L. (2000), "Knowledge and social capital", in Lessor, E.L. (Ed.), *Resources for the Knowledge-based Economy*, Butterworth-Heinemann, Oxford.

Putnam, R.D. (1995), "Bowling alone: America's declining social capital", *Journal of Democracy*, Vol. 6 No. 1, pp. 65-78.

Snowden, D. (1998), "I only know what I know when I need to know it – embracing the active management of tacit knowledge", *Knowledge Management*, March, p. 98.

Snowden, D. (1999), "The Paradox of story: simplicity and complexity in strategy", *Journal of Strategy & Scenario Planning*, November, pp. 16-20.

Snowden, D. (2000), "Storytelling: an old skill in a new context – the art and science of story or 'Are you sitting uncomfortably'?", *Business Information Review*, Vol. 17 No. 3, pp. 147-56.

Stewart, T.A. (1998), "The cunning plots of leadership", *Fortune*, 7 September, available at: www.business2.com/articles/mag/0,1640,3858,00.html

Streatfield, D. and Wilson, T. (1999), "Deconstructing knowledge management", *Aslib Proceedings*, Vol. 51 No. 3, pp. 67-71.

TFPL Research and Consultancy (2000), *Skills for Knowledge Management: Building a Knowledge Economy*, TFPL, London.

Weinstein, K. (1995), *Action Learning: A Journey in Discovery and Development*, Harper Collins, London.

Wenger, E. (2001), *Supporting Communities of Practice*, Draft version 1.3, available at: www.ewenger.com/tech/executive_summary.htm (accessed 28 June 2002).

Wenger, E., McDermott, R. and Snyder, W.M. (2002), *Cultivating Communities of Practice*, Harvard Business School, Boston, MA.

Further reading

Coghlan, D. and Brannick, T. (2001), *Doing Action Research: In Your Own Organisation*, Sage, London.

Patrick, K., Rourke, G. and Phillips, N. (2000), "Issues of trust in knowledge management", *Vine*, No. 121, September, pp. 44-51.

Wenger, E. (1999), *Communities of Practice: Learning, Meaning, and Identity*, Cambridge University Press, Cambridge.

Notes for contributors

Aslib Proceedings: New Information Perspectives

Copyright

Articles submitted to the journal should be original contributions and should not be under consideration for any other publication at the same time. Authors submitting articles for publication warrant that the work is not an infringement of any existing **copyright** and will indemnify the publisher against any breach of such warranty. For ease of dissemination and to ensure proper policing of use, papers and contributions become the legal copyright of the publisher unless otherwise agreed. Articles should be submitted by e-mail or on disc to:

The Editor
Professor David Nicholas, Head of Department,
Department of Information Science, City University,
Northampton Square, London EC1V 0HB, UK.
E-mail: nicky@soi.city.ac.uk

Editorial objectives

Aslib Proceedings: New Information Perspectives brings currency, authority and accessibility to the reporting of current research, issues and debates in the broad area of information work. Above all, the journal wishes to provide research and comment in a form that is easily and quickly understood: a fresh, rigorous, but unfussy, writing style is what is aimed for. The needs of busy practitioners (and academics) are very much in mind. Articles are refereed to meet the need for accredited and authoritative information. To ensure that this does not result in an unacceptable loss of currency, articles are speedily refereed by the journal's large, eminent and multi-disciplinary Editorial Board (assembled for just such a purpose). In some cases they may be referred to an external panel of consultants. The submission of research in progress articles is encouraged.

Final submission checklist

- Accurate, checked hard copy
- Abstracts and keywords
- Correct, complete Harvard references
- Figures and illustrations in electronic and hard copy form
- Text on labelled disk or CD-ROM or as attached file if requested by editor
- Completed/signed journal article record form

The boundaries of information work are rapidly changing and widening. *Aslib Proceedings* has a role to play in the repositioning of the information profession by encouraging submissions from information managers, providers, packagers and consumers of all kinds – and especially those from the related fields of journalism, electronic publishing, communication and Internet studies.

Manuscript requirements

As a guide, articles should be between 2,000 and 8,000 words in **length.** A **title** of not more than eight words should be provided. A brief **autobiographical note** should be supplied including full name, affiliation, e-mail address and full international contact details. Authors must supply an **abstract** of 100-150 words. Up to six **keywords** should be included which encapsulate the principal subjects covered by the article.

Where there is a **methodology,** it should be clearly described under a separate heading. **Headings** must be short, clearly defined and not numbered. **Notes** or **Endnotes** should be used only if absolutely necessary and must be identified in the text by consecutive numbers, enclosed in square brackets and listed at the end of the article.

All **Figures** (charts, diagrams and line drawings) and **Plates** (photographic images) should be submitted in both electronic form and hard copy originals. Figures should be of clear quality, black and white and numbered consecutively with arabic numerals.

Electronic figures should be either copied and pasted or saved and imported from the origination software into a blank Microsoft Word document. Figures created in MS Powerpoint are also acceptable. Acceptable standard image formats are: .eps, .pdf, .ai and .wmf. If you are unable to supply graphics in these formats then please ensure they are .tif, .jpeg, .bmp, .pcx, .pic, .gif or .pct at a resolution of at least 300dpi and at least 10cm wide. To prepare **screenshots** simultaneously press the "Alt" and "Print screen" keys on the keyboard, open a blank Microsoft Word document and simultaneously press "Ctrl" and "V" to paste the image. (Capture all the contents/windows on the computer screen to paste into MS Word, by simultaneously pressing "Ctrl" and "Print screen".)

For photographic images (plates) good quality original photographs should be submitted. If supplied electronically they should be saved as .tif or .jpeg files at a resolution of at least 300dpi and at least 10cm wide. Digital camera settings should be set at the highest resolution/quality as possible.

In the text of the paper the preferred position of all figures and plates should be indicated by typing on a separate line the words "Take in Figure (No.)" or "Take in Plate (No.)". Supply succinct and clear captions for all figures and plates.

Tables must be numbered consecutively with roman numerals and a brief title. In the text, the position of the table should be shown by typing on a separate line the words "Take in Table IV".

References to other publications must be in Harvard style and carefully checked for completeness, accuracy and consistency. This is very important in an electronic environment because it enables your readers to exploit the Reference Linking facility on the database and link back to the works you have cited through CrossRef. You should include all author names and initials and give any journal title in full.

You should cite publications in the text: (Adams, 1997) using the first named author's name. At the end of the paper a reference list in alphabetical order should be supplied:

For books: surname, initials, (year), *title of book*, publisher, place of publication, e.g. Fallbright, A. and Khan, G. (2001), *Competing Strategies*, Outhouse Press, Rochester.

For book chapters: surname, initials, (year), "chapter title", editor's surname, initials, *title of book*, publisher, place of publication, pages, e.g. Bessley, M. and Wilson, P. (1999), "Marketing for the production manager", in Levicki, J. (Ed.), *Taking the Blinkers off Managers*, Broom Relm, London, pp.29-33.

For journals: surname, initials, (year), "title of article", *journal name*, volume, number, pages, e.g. Greenwald, E. (2000), "Empowered to serve", *Management Decision*, Vol. 33 No. 5, pp. 6-10.

For electronic sources: if available online the full URL should be supplied at the end of the reference.

Final submission of the article

Once accepted for publication, the final version of the manuscript must be provided, accompanied by a 3.5" **disk, Zip disk** or **CD-ROM** of the same version labelled with: disk format (Macintosh or PC); author name(s); title of article; journal title; file name.

Alternatively, the editor may request the final version as an attached file to an e-mail.

Each article must be accompanied by a completed and signed **Journal Article Record Form** available from the Editor or on http://www.emeraldinsight.com/literaticlub/jarforms.htm

The manuscript will be considered to be the definitive version of the article. The author must ensure that it is complete, grammatically correct and without spelling or typographical errors.

In preparing the disk, please use one of the following preferred formats: Word, Word Perfect, Rich text format or TeX/LaTeX.

Technical assistance is available from Emerald's Literati Club on http://www.emeraldinsight.com/literaticlub or by contacting Mike Massey at Emerald, e-mail: mmassey@emeraldinsight.com

Aslib Proceedings

New Information Perspectives

Volume 55 Number 4 2003
In 2003 this journal will consist of 6 printed issues delivered in 5 despatches
+ Internet Online Publishing with Archive, Active Reference Linking, Emerald WIRE, Key Readings,
Research Register, Non-article Content, Institution-wide Licence, E-mail Alerting Service and Usage Statistics

Contents

Number 4

190 Access this journal online

191 Abstracts & keywords

193 Can remote Internet voting increase turnout?
Susan Henry

203 The British Life and Internet Project: inaugural survey findings
Barrie Gunter, Chris Russell, Richard Withey and David Nicholas

217 On open source IR
Andrew MacFarlane

223 Training cataloguing students using a mix of media and technologies
Linda M. Cloete, Retha Snyman and J.C. Cronjé

234 The enterprise portal – is it knowledge management?
Marian Cloete and Retha Snyman

243 Seeding a community of interest: the experience of the knowledge library project
Andrew Cox, Keith Patrick and Rahman Abdullah

www.emeraldins

Aslib Proceedings

New Information Perspectives

Health informatics: inter-disciplinary and multi-disciplinary perspectives

Guest Editors: Peter Williams and Paul Huntington

Library Link
www.emeraldinsight.com/librarylink

Aslib imi
INFORMATION MANAGEMENT

Emeral
www.emeraldinsight.c

Aslib Proceedings: New Information Perspectives
ISBN 0-86176-919-8
ISSN 0001-253X
©2003 MCB UP Limited

Aslib Proceedings: New Information Perspectives is a refereed journal of international repute that brings currency, authority and accessibility to the reporting of research, issues and debates in the broad area of information work.

Aslib Proceedings: New Information Perspectives is published in association with Aslib, The Association for Information Management.

Guest Editors Peter Williams
Research Fellow, Department of Information Science, City University, London, UK
Paul Huntington
Senior Research Fellow, Department of Information Science, City University, London, UK
Editor Professor David Nicholas
Director, Centre for Information Behaviour and Research, City University, London, UK.
E-mail: nicky@soi.city.ac.uk
Deputy Editor Dr Ian Rowlands
Senior Lecturer, Department of Information Science, City University, London, UK
Editorial Manager Kay Nicholas
Research Administrator, Digital Consumer Health Research Project, Department of Information Science, City University, London, UK
Managing Editor Diane Heath

Editorial Board
Ralph Adam
Freelance Journalist, City University, London, UK
John Akeroyd
Director, Learning Resources, South Bank University, London, UK
David Brown
Director, Publishing Relations, British Library, UK
Peter Chapman
Information Consultant, Banbury, UK
Professor Peter Cole
Head of Department, Department of Journalism, University of Sheffield, UK
Dr Tom Dobrowolski
Senior Lecturer, Institute of Information Science and the Book, University of Warsaw, Poland
Harry East
Honorary Research Fellow, Department of Information Science, City University, London, UK
Professor David Ellis
Research Director, Department of Information and Library Studies, University of Wales, Aberystwyth, UK
Professor Ben Fouche
Head of Department, Department of Information Science, Stellenbosch University, Matieland, South Africa
Eti Herman
Vice-Director, Library, University of Haifa, Israel
Nat Lievesley
Network Manager, Centre for Policy on Ageing, London, UK
Helen Martin
Media Information Consultant, London, UK
Anthony Watkinson
Publishing Consultant, Oxford, UK
Richard Withey
Global Director, Interactive Media, Independent News and Media, UK

This journal is also available online at www.emeraldinsight.com/ap.htm

Internet services available worldwide on URL www.emeraldinsight.com

Emerald
60/62 Toller Lane, Bradford,
West Yorkshire, England BD8 9BY
Tel +44 (0) 1274 777700
Fax +44 (0) 1274 785200
E-mail **help@emeraldinsight.com**

INVESTOR IN PEOPLE

Aslib Proceedings: New Information Perspectives is one of the 21 titles published in the field of Library and Information services that support Library Link. Library Link is a world-wide network that revolves around an Internet forum. Its remit is to be a valuable free resource to librarians. This includes providing detailed information on current issues within the field of Library and Information services and putting members in touch with like-minded individuals world-wide.
To become a member, access the Library Link Internet site at:
http://www.emeraldinsight.com/librarylink
Other titles published by Emerald in the field and featured at the Library Link site are: *The Bottom Line: Managing Library Finances, Campus-Wide Information Systems, Collection Building, The Electronic Library, Forthcoming International Scientific and Technical Conferences, Interlending & Document Supply, Internet Research, Journal of Documentation, Library Management, Library Hi Tech, Library HiTech News, Library Review, New Library World, OCLC Systems & Services, Online Information Review, Performance Measurement and Metrics, Program: electronic library and information systems, Records Management Journal, Reference Reviews, and Reference Service Reviews.*

Pre-press activities, comprising origination and pagination, associated with the publication of management journals

Regional offices:

For North America
Emerald, 44 Brattle Street, 4th Floor,
Cambridge, MA 02138, USA
Tel Toll free +1 888 622 0075; Fax +1 617 354 6875
E-mail **america@emeraldinsight.com**

For Japan
Emerald, Reina 308, 5-1 Sakae-cho, Kanagawa-ku,
Yokahama City, Kanagawa Prefecture, 221-0052 Japan
Tel +81 45 444 0388; Fax +81 45 444 0389
E-mail **japan@emeraldinsight.com**

For Asia Pacific
Emerald, 7-2, 7th Floor, Menara KLH, Bandar Puchong Jaya,
47100 Puchong, Selangor, Malaysia
Tel +60 3 8076 6009; Fax +60 3 8076 6007
E-mail **asiapacific@emeraldinsight.com**

Contact details
Customer helpdesk:
Tel +44 (0) 1274 785278; Fax +44 (0) 1274 785204;
E-mail **support@emeraldinsight.com**
Orders, subscription and missing claims enquiries:
Tel +44 (0) 1274 777700; Fax +44 (0) 1274 785200

Reprint service enquiries:
Carole Noble, Bradford
E-mail **cnoble@emeraldinsight.com**

Copyright permissions:
Charles Parker, Bradford
E-mail **cparker@emeraldinsight.com**

Missing issue claims will be fulfilled if claimed within four months of date of despatch. Maximum of one claim per issue.

No part of this journal may be reproduced, stored in a retrieval system, transmitted in any form or by any means electronic, mechanical, photocopying, recording or otherwise without either the prior written permission of the publisher or a licence permitting restricted copying issued in the UK by The Copyright Licensing Agency and in the USA by The Copyright Clearance Center. No responsibility is accepted for the accuracy of information contained in the text, illustrations or advertisements. The opinions expressed in the articles are not necessarily those of the Editor or the publisher.

Emerald is a trading name of MCB UP Limited

Printed by Printhaus Group Ltd, Scirocco Close,
Moulton Park, Northampton NN3 6HE

9.12.03

Aslib Proceedings: New Information Perspectives

Volume 55, Number 5/6, 2003 ISSN 0001-253X

Health informatics: inter-disciplinary and multi-disciplinary perspectives

Guest Editors: Peter Williams and Paul Huntington

Contents

254 Access this journal online

255 Abstracts & keywords

258 Guest editorial

261 **The British and their use of the Web for health information and advice: a survey**
David Nicholas, Paul Huntington, Barrie Gunter, Chris Russell and Richard Withey

277 **Characterising and profiling health Web user and site types: going beyond "hits"**
Paul Huntington, David Nicholas and Peter Williams

290 **Information needs of people with multiple sclerosis and the implications for information provision based on a national UK survey**
Mark Hepworth, Janet Harrison and Nicole James

304 **Health information on the Internet: a qualitative study of NHS Direct Online users**
Peter Williams, Paul Huntington and David Nicholas

313 **Seeking alcohol information on the Internet**
Adam N. Joinson and Phil Banyard

320 **Availability and use of information touch-screen kiosks (to facilitate social inclusion)**
Markella Boudioni

334 **Making health information accessible to patients**
Ray Jones

339 **The potential for using hospital bedside TV services in England to provide patients with access to health information**
Gavin McWhirter

346 **Digital interactive television: health information platform of the future?**
Barrie Gunter, David Nicholas, Paul Huntington and Peter Williams

357 **Public awareness of patient rights, consent forms and advance statements**
Julia Dandy

367 **diabCAL: evaluating computer-aided learning for diabetes patient education**
Emma-Jane Berridge and A.V. Roudsari

379 **The publication of cancer research papers in high impact journals**
Grant Lewison

388 Awards for Excellence

389 Author and title index to volume 55, 2003

Access this journal electronically

The current and past volumes of this journal are available at

www.emeraldinsight.com/ft

You can access over 100 additional Emerald journals, each with a comprehensive searchable archive of articles (many dating back to 1989), a detailed classification system and links to referenced material.

See page following contents for full details of what your access includes.

Emerald

Access this journal online

www.emeraldinsight.com/ap.htm

As a subscriber to this journal, you can benefit from instant, electronic access to the content of this title. Your access includes a variety of features that increase the value of your journal subscription.

Automatic permission to make up to 25 copies of individual articles

This facility can be used for teaching purposes, training courses, meetings or seminars. This only applies to articles of which Emerald owns copyright. For further details visit **www.emeraldinsight.com/copyright**

How to access this journal electronically

To benefit from electronic access to this journal you first need to register on the Internet. Registration is simple and full instructions are available online at **www.emeraldinsight.com/register**
Once completed, your institution will have instant access to the journal content from **www.emeraldinsight.com** or via the journal homepage **www.emeraldinsight.com/ap.htm**

Our liberal institution-wide licence allows everyone within your institution to access your journal electronically, thus making your subscription more cost-effective. Our Web site has been designed to provide you with a comprehensive, simple system that needs only minimum administration. Access is available via IP authentication or username and password.

Key features of Emerald electronic journals

Online Publishing and Archiving
You can gain access to past volumes as well as new material from this journal on the Internet via Emerald Fulltext. You can browse or search the database for relevant articles.

Key Reading
This feature provides abstracts of articles chosen by the journal editor on the basis of their subject-matter. These are selected to provide readers with current awareness of interesting articles from other publications within the same field.

Reference Linking
Direct links are provided from the journal article references to abstracts of the most influential articles cited (where possible this is to the full text of the article).

E-mail an Article
This facility allows you to e-mail relevant and interesting articles in PDF format to another PC for later use, reference or printing purposes.

Non-Article Content
The non-article content of our journals (product and materials information, industry trends, company news, etc.) is available online so that it can be accessed by users. It is possible to browse or search non-article content by keyword.

Additional Complementary Services Available

Your access includes a variety of features that add to the functionality and value of your journal subscription:

E-mail Services
Emerald's range of free e-mail alerting services is designed to deliver personal notification of news and features in a number different interest areas.

Emerald WIRE (World Independent Reviews)
Emerald WIRE is a fully searchable, subject-specific database brought to you by Emerald Management Reviews. It provides article reviews from the world's top management journals. The database is updated monthly and gives users details of how to obtain the full text of original articles.

Research Register
Located at **www.emeraldinsight.com/researchregister**, the Emerald Research Register is an Internet research forum where you and your readers can identify information on research activit world-wide. This feature is invaluable if you are seeking information or wish to disseminate information about your own research.

Support Resources
Comprehensive librarian and user toolkits have been created to help you get the most from your journal subscription. For further information about what is available visit **www.emeraldinsight.com/usertoolkit**

Choice of Access

Electronic access to this journal is available via a number of channels, enabling end users and libraries to reach the conten through their preferred delivery system. The Emerald Fulltext We site – **www.emeraldinsight.com/ft** – is the recommended mean of electronic access, as it provides fully searchable and high value-added access to the complete content of the journal.

Subscribers can also access and search the article content of thi journal through the following journal delivery services:

EBSCOhost EJS
journals.ebsco.com

Huber E-Journals
e-journals.hanshuber.com/english/index.htm

Minerva
www.minerva.at

OCLC Firstsearch Electronic Collections Online
www.uk.oclc.org/oclc/menu/eco.htm

SilverPlatter
www.silverplatter.com

SwetsBlackwell's SwetsWise
www.swetswise.com

Emerald Customer Support Services

For customer service and technical help, contact:
E-mail **support@emeraldinsight.com**
Tel +44 (0) 1274 785278
Fax +44 (0) 1274 785204

Abstracts & keywords

The British and their use of the Web for health information and advice: a survey

David Nicholas, Paul Huntington, Barrie Gunter, Chris Russell and Richard Withey

Keywords Health services, Worldwide web, User studies, United Kingdom

In the UK, both anecdotal and research evidence points to ever greater and more sophisticated use of the Web to provide health information and advice. The study reported here adds to this research with an online survey of Internet users' reported use of the Web to access information about health and their opinions about the advice that can be obtained there. Over a period of three weeks more than 1,300 people responded to an online questionnaire produced by The British Life and Internet Project; 81 per cent or 997 of the respondents were British. The prime purpose of the questionnaire was to obtain information on the characteristics of the users of health information Web sites, to obtain feedback regarding for what they used online health sites and what were the perceived outcomes associated with using online health information.

Characterising and profiling health Web user and site types: going beyond "hits"

Paul Huntington, David Nicholas and Peter Williams

Keywords Health services, User studies, Worldwide web, Customer profiling

Identifies Internet health user types according to three factors: site attributes most favoured, health topics most sought, and the health sites they visited. Knowing what type of consumer uses a site is important, as this should inform menu structure and provide an understanding of why certain kinds of people visit certain sites. Web sites even in the same field will not appeal to all users. Much of this differentiation will come down to design and feel of the site, although site attributes and information needs also impact here. Data were obtained from an online questionnaire placed on the SurgeryDoor Web site, a site which provides consumer health information. In all a total of 1,068 responses were received. Shows that useful groupings can indeed be constructed. Users were also classified according to additional health sites visited, also a preference metric, and this additionally is related to site attribute preferences, information needs and user characteristics.

Information needs of people with multiple sclerosis and the implications for information provision based on a national UK survey

Mark Hepworth, Janet Harrison and Nicole James

Keywords Health education, Information, Personal needs, United Kingdom

Qualitative and quantitative methods were used to study the information needs of people with multiple sclerosis (MS) in the UK. Categories of information need were identified; their importance and difficulty in obtaining them quantified. The research highlighted how there were significant differences in terms of people's desire for the information, the topics in which they were interested and how they wanted that information. Information provision to people with MS was found to have improved dramatically over the last seven years, but was found to be inconsistent in terms of subjects covered. However, it should be borne in mind that at the time of diagnosis, and also afterwards, it may be difficult for people to take on board information for a variety of reasons. Furthermore, different individual needs mean that information provision is a complex task. Many intervening factors can make it fail. The research made it clear how access to relevant information, provided in an appropriate way, could significantly improve the quality of life of the person with MS and that there is considerable scope for improving provision of information to people with MS.

Health information on the Internet: a qualitative study of NHS Direct Online users

Peter Williams, Paul Huntington and David Nicholas

Keywords Internet, Health education, National Health Service, Quality, Surveys

Examines the way the general public exploits the Internet for health information, the motives behind usage, attitudes towards issues such as quality concerns, and the extent to which Internet interventions affect the doctor-patient relationship. Although a questionnaire survey was used (posted on the NHS Direct Web site), the questions asked were open, and invited free-text "qualitative" answers. This method was a success in terms of the amount and richness of the data accrued. Results suggested that the Internet is exploited in a wide variety of ways, by users acting in a number of roles

© MCB UP Limited · ISSN 0001-253X

– patient, intermediary or professional. Some health professionals are now so comfortable with the Internet that they encourage Internet usage by their patients. Lay users demonstrated a high level of understanding of issues raised, and showed a (healthy?) scepticism regarding the information provided. Many users felt that their consultations with doctors had been enriched by Internet-acquired information.

Seeking alcohol information on the Internet

Adam N. Joinson and Phil Banyard

Keywords Internet, Worldwide web, Information gathering, Health education, Alcoholic drinks

It has been argued that people may be more willing to seek potentially threatening information on the Internet than they would in "real life". For alcohol drinkers, potentially threatening information includes diagnostic information on the amount they drink, and information about the negative effects of alcohol consumption. In the present study, participants with varying levels of alcohol intake and plans for change chose four alcohol-related articles to read (from 12), using either the World Wide Web (WWW) or pen and paper. Results showed that drinkers not currently reducing their drinking were more likely to seek diagnostic, potentially threatening anti-drinking information via the WWW compared with when seeking paper-based information. Drinkers either contemplating or engaging in efforts to reduce their drinking sought pro-drinking information on the WWW and anti-drinking information when using pen and paper. The potential role of the Internet, and perceived anonymity, in health promotion are discussed.

Availability and use of information touch-screen kiosks (to facilitate social inclusion)

Markella Boudioni

Keywords Social alienation, Employment, Health education, Information, Community care, User studies

The availability and the use of touch-screen systems for accessing a range of information in different settings in the UK, in particular from socially excluded groups, are reviewed. A literature review and consultations with stakeholders are conducted. Touch-screens are used widely by the Department of Works and Pensions; they are used for community services on a much smaller scale. NHS Direct provides the largest number of kiosks for health information and promotion; InTouch with Health, Wellpoint Health Centres, Patient Information for Consent Systems are some other examples. Some projects that target socially excluded groups are identified. Factors that determine usage and contribute to successful usage are also identified. The majority of stakeholders express the view that kiosks should be available in a variety of locations, irrespective of their specific content and information.

Making health information accessible to patients

Ray Jones

Keywords Internet, Information, Health education, National Health Service, Patients, United Kingdom

Many NHS policy documents state the need to make health information accessible to all. Accessibility comprises physical availability and personal retrievability. Touch-screen public access kiosks have been available since the early 1990s and there is some evidence from a study of NHS Direct kiosks that they could improve physical access to health information. Most health centres have little space for longer use of computers by patients. Eventually home access to the Internet will be available to most people. In the meantime, computers based in public libraries offer potential to provide health information for patients referred by their GP. However, more thought is needed as to the format and content of the information. Information tailored using the patient's medical record is preferred by patients and may enable patients to engage more social support. More evidence is needed from well-designed studies to inform the debate.

The potential for using hospital bedside TV services in England to provide patients with access to health information

Gavin McWhirter

Keywords Hospitals, Television, Information, Patients, Health education, United Kingdom

This article is a summary of a report which looks at the potential of using television sets at hospital bedsides to provide patients with access to health information. The report was jointly commissioned by The Department of Health (DoH) and National Health Service (NHS) Direct Online, and focused on what could be done using existing (or planned) Patient Power infrastructure. The latest generation of systems from all three of the main suppliers of bedside television service could provide access to health information in a variety of ways. A group meeting was held with key internal DoH and NHS stakeholders. Interviews were held with the main suppliers of bedside television services. Opinions were also taken from several academics specialising in Health Informatics, from a range of commercial health information providers and a wide range of NHS Trust representatives. Two areas where further research would be of use are looking at the opportunities around digital radio as a way of providing patients with health information, and looking at any particular issues that exist around communication with patients while they are in hospital.

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · 255-257

Digital interactive television: health information platform of the future?

Barrie Gunter, David Nicholas, Paul Huntington and Peter Williams

Keywords Interactive devices, Television, Health education, Information, Forecasting, User studies

Presents research that was designed to explore the early take-up of a pilot digital interactive television (DiTV) health information service (Living Health) by cable television subscribers in Birmingham, UK. Log data indicated real-time viewing behaviour of subscribers to the cable network on which the digital health service was carried. A survey of users delivered a return sample of 723 subscribers. Log data indicated an initial surge in use that subsided and stabilised at a lower level. Over one third of cable network subscribers visited the digital health TV site at least once during a 20-week pilot period. The most popularly visited pages concerned sex-related information. In the user survey, just under one in four respondents had reportedly used the DiTV service. The user profile was oriented towards older men and young adult women. Over eight in ten users found the service easy to use and understand. Over half of users consulted the service in connection with a GP visit. Some evidence emerged that use of DiTV might substitute for consulting a doctor among some users.

Public awareness of patient rights, consent forms and advance statements

Julia Dandy

Keywords Patients, Human rights, Information

The subject of this study is the availability of, and access to, information concerning individuals' end-of-life health situations. The sensitive issues surrounding this subject are considered in detail, and the restraints, primarily legal, placed upon information availability highlighted. Questionnaires and interviews were used to determine public and professional awareness of, and attitudes towards, the issues and were compared with a similar, albeit larger, survey conducted by the Department of Health. Complementary to this fieldwork, a review of current and proposed clinical policies, guidelines and legislation and of media commentary was undertaken. The study revealed much public confusion and ignorance about how people can influence the medical treatment they receive when seriously or terminally ill. The study revealed an urgent need for Government initiatives to provide more information on patient rights in relation to consent forms and advance statements.

diabCAL: evaluating computer-aided learning for diabetes patient education

Emma-Jane Berridge and A. V. Roudsari

Keywords Computer based learning, Diabetes, Patients, Health education, Function evaluation

The design and development of a computer-aided learning tool for the education of patients with diabetes and for the training and support of practice nurses providing diabetes care have been previously reported. diabCAL is a broad and comprehensive learning tool, which can be accessed as a modular course or a desktop quick-reference. Evaluation is central to the design process and can be formative, informing design and development throughout the lifecycle, or summative, assessing the value of the finished product. diabCAL was subject to rigorous evaluation at various stages during development, including: verification of curriculum content and structure, evaluation of navigation and evaluation of system content. A final hybrid formative-summative evaluation assessed usability and acceptability of the system. Evaluations were conducted by technical experts and users, and findings of the final evaluation study, conducted by patients, confirmed that diabCAL was acceptable to most users – that is, interesting and perceived to be useful – even to those with little previous computer experience.

The publication of cancer research papers in high impact journals

Grant Lewison

Keywords Literature, Research, Cancer, Journals

Examines a set of over 27,000 UK papers in cancer research in order to identify the individual factors that influence the impact category of the journals in which they are published, using multiple regression analysis. The most important independent variables that have a positive effect are the numbers of authors and funding bodies, the research level (from clinical to basic), and the presence of certain universities, or of the USA, in the address field. Inter-lab co-operation was shown to have a negative effect on journal impact category, as was international co-authorship. It is because such partnerships usually involve more authors and funding for the research that they are perceived to lead to higher impact work. There is also a tendency for papers to be published in higher impact journals in later years, probably because of market forces, which means that such journals will tend to expand.

Guest editorial

About the Guest Editors

Peter Williams and **Paul Huntington** are Research Fellows, both at the Centre for Information Behaviour and the Evaluation of Research, Department of Information Science, City University, London, UK.

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · pp. 258-260
© MCB UP Limited · ISSN 0001-253X

We are witnessing a digital information revolution of enormous scale. For many people the Internet, digital interactive television, the touch-screen kiosk and mobile phone have resulted in the overnight transformation of an information-poor world into an information-rich one. We have moved from a world in which information needs were rarely ever effectively met – certainly not without a tremendous expenditure of effort and cost – to one in which they are "potentially" only too easily met. This has created something in the way of a culture shock – to both information intermediary and end-user.

All this is perhaps truer with regard to the provision of health information and advice than anything else. Indeed, it would be no exaggeration to say that health informatics, especially consumer health informatics, has pioneered the digital way. This special double issue of *Aslib Proceedings* provides proof of this. We publish here a dozen articles, which together show the leadership qualities of the field, its inter-disciplinarity and multi-disciplinarity and its methodological riches and robustness.

The articles selected here discuss a wide range of issues, from a number of different perspectives, utilising several radically different methodologies. Needless to say, given this spectrum, the authors came from a mix of subject backgrounds. These include information practitioners (Dandy), academic researchers (Williams, Berridge and Roudsari, Boudioni, Huntington), University lecturers (Nicholas, Hepworth, Jones, Joinson), and IT consultants (McWhirter). Many subject disciplines are represented too – perhaps highlighting the ubiquity and the complexity of health information. Naturally, there is a fair smattering of information science specialists, including those whose specialisms lie in information needs (Nicholas, Hepworth), education (Williams), bibliometrics (Lewison) and librarianship (Dandy). However, also represented are health specialists (Jones, Berridge and Roudsari, Boudioni), a computer log analyst (Huntington), a mass communication and journalism expert (Gunter), and two psychologists (Joinson and Banyard).

Before reviewing individual papers it is worth highlighting the range of methodologies used. They cover the full spectrum, from in-depth interviews with key health professionals (McWhirter, Dandy) and information users (Boudioni), to formal usability studies (Berridge) and statistical analysis (Huntington *et al.*, Lewison). In between are survey findings from large-scale predominantly closed questionnaires (Nicholas *et al.*), free text open-ended online surveys (Williams *et al.*), psychological tests (Joinson and Banyard) and usability studies (Berridge and Roudsari). Multi-methods are featured by Gunter *et al.* (log analysis and questionnaires) and Dandy (library research and surveys). Jones, by contrast, provides an overview of research into the efficacy of providing patient information via touch-screen information systems.

Nicholas and colleagues lead with a broad examination of health on the Net via an online survey of Internet users' reported utilisation of the Web. The paper examines the characteristics of users of health information Web sites, for what they used online health sites and what were the perceived outcomes associated with using online health information.

Huntington *et al.* continue the theme of health Web site user types. The paper classifies user types according to three factors: site attributes most favoured, health topics most sought, and the health sites they visited. Clearly knowing what type of consumer uses a site is important, as this should inform menu structure and provide an understanding of why certain kinds of people visit certain sites. Web sites even in the same field will not appeal to all users. Much of this differentiation will come down to design and feel of the site, although site attributes and information needs also impact.

A predominant theme throughout many articles published here is that of information needs and how current technological systems can help meet these. Hepworth *et al.*, for example, discuss the information needs of people with MS and how these might be met using particular Web authoring tools. They found that needs are multifarious, and that some individuals do not see information as the panacea to their problems. This is a useful wake-up call for the information specialists. In their study of the use of the Internet for health information, Williams *et al.* found a huge variation in reasons for going to the Net and in the roles of people who do so (i.e. as patient, intermediary professional or for general interest). Often users would be seeking information from a number of perspectives during the same search session.

Joinson and Banyard look at information seeking and use from the discipline of psychology. The authors argue that people may be more willing to seek potentially threatening information on the Internet than they would in "real life". In the study reported, participants with varying levels of alcohol intake and plans for change chose four alcohol-related articles to read, using either the World Wide Web (WWW) or pen and paper. Results showed that drinkers not currently reducing their drinking were more likely to seek diagnostic, potentially threatening anti-drinking information via the WWW compared with when seeking paper-based information. Results suggested that there seems to be an effect of medium on information seeking – with modes of information seeking having a level of identifiability attached, people seem to behave in a socially desirable manner (i.e. seeking anti-drinking information). Second, the current health behaviour and plans for change lead to different information-seeking motivations, which may well also interact with medium.

Many of the contributors look at the other side of the "needs" coin – how to provide most effectively the information that is required. Boudioni reviews the availability and the use of touch-screen systems for accessing a range of information in different settings, in particular from socially excluded groups. She also identifies factors, which determine usage and contribute to successful usage. These include a simple interface that takes into account the computer skills and the educational level of possible users, and a screen design to allow for easy navigation within and between menu hierarchies. Jones's research indicates that more thought is needed with regard to the format and content of the information and to providing customised information based on patient records.

McWhirter looks at the potential of using television sets at hospital bedsides to provide patients with access to health information. The author admits that it is not clear what sort of appetite patients have for consuming and absorbing health information while in a hospital bed, and what difference it will make if the information is provided in text, audio or video form. The interesting conclusion reached is that radio might be a more effective and efficient way of providing people with access to health information than as text or by using videos.

Gunter and colleagues present research exploring the early take-up of a pilot digital interactive television (DiTV) health information service (Living Health). Over one third of cable network subscribers visited the digital health TV site at least once during a 20-week pilot period. The user profile was oriented towards older men and young adult women. Use of the service was predicted by users having a young child, being in a low-income neighbourhood, and having a special interest in a health condition. Over half of users consulted the service in connection with a GP visit. The Department of Health in the UK has made a major investment in testing the potential of DiTV as a health information platform. The early indications are that this is a platform with promise. Longer-term commitment and observation will indicate how effective this technology can be in relation to a range of different health information and advisory functions and how best it can be utilised to benefit public health care and the health profession.

Dandy examines the availability of, and access to, information concerning individuals' end-of-life health situations. The study revealed much public confusion and ignorance about how people can influence the medical treatment they receive when seriously or terminally ill. She suggests that there was an urgent need for Government initiatives to provide more information on patient rights in relation to consent forms and advance statements.

Berridge and Roudsari take yet another angle on the theme of health information seeking and provision. Their paper evaluates the usability of a computer-aided learning tool for the education of patients with diabetes – diabCAL. This was subject to rigorous evaluation at various stages during development, including an evaluation of navigation and evaluation of system content. Tests were conducted by technical experts and users, and findings of the final evaluation study, conducted by patients, confirmed that diabCAL was acceptable to most users – that is, interesting and perceived to be useful – even to those with little previous computer experience.

Lewison shows the unique contribution of bibliometrics to the field in a paper that examines UK papers in cancer research in order to identify the individual factors that influence the impact category of the journals in which they are published, using multiple regression analysis.

Finally, drawing all these studies, reports and commentaries together, there are a number of important issues. First, information need is complex, with people seeking information for a variety of purposes and in a number of different roles (Williams *et al.*). A salutary lesson is that, for many people, this activity is not the No. 1 priority with regard to their health (Hepworth *et al.*). Seeking information depends upon a number of issues, such as perceived privacy (Joinson and Banyard), availability and clarity of information (Dandy), navigating systems (Boudioni). Some optimism was expressed, however. Digital TV seems to be reaching groups of health consumers that other electronic systems miss (Gunter *et al.*) and other initiatives, such as hospital bedside services and more widely deployed touch-screen systems, may extend the reach yet further (McWhirter, Jones). Berridge and Roudsari show that careful formative testing and involvement of (potential) users lead to excellent systems, easily accessible, which meet real needs. In sum, the papers offer much food for thought (and action), some optimism, and many questions. We hope they prove useful.

All papers in this special issue were solicited on the basis of the expertise of the authors and the relevance of their work to the field of health informatics. They were refereed by the special editors and the Editorial Board during the period 1 June to 1 July 2003.

Peter Williams and Paul Huntington

The British and their use of the Web for health information and advice: a survey

David Nicholas, Paul Huntington, Barrie Gunter, Chris Russell and Richard Withey

The authors

David Nicholas is Head of Department, **Paul Huntington** is Senior Research Fellow, both at the Centre for Information Behaviour and the Evaluation of Research (CIBER), Department of Information Science, City University, London, UK.
Barrie Gunter is Professor of Journalism Studies, Department of Journalism Studies, University of Sheffield, Sheffield, UK.
Chris Russell and Richard Withey are both at the Centre for Information Behaviour and the Evaluation of Research (CIBER), Department of Information Science, City University, London, UK.

Keywords

Health services, World Wide Web, User studies, United Kingdom

Abstract

In the UK, both anecdotal and research evidence points to ever greater and more sophisticated use of the Web to provide health information and advice. The study reported here adds to this research with an online survey of Internet users' reported use of the Web to access information about health and their opinions about the advice that can be obtained there. Over a period of three weeks more than 1,300 people responded to an online questionnaire produced by The British Life and Internet Project; 81 per cent or 997 of the respondents were British. The prime purpose of the questionnaire was to obtain information on the characteristics of the users of health information Web sites, to obtain feedback regarding for what they used online health sites and what were the perceived outcomes associated with using online health information.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · pp. 261-276
© MCB UP Limited
ISSN 0001-253X
DOI 10.1108/00012530310498842

Introduction

The researchers have spent the last three years charting the first footfalls of the digital health consumer on behalf of the Department of Health (Nicholas *et al.*, 2000-2003, 2001-2002). In this regard we have explored the use of a variety of digital platforms – touch-screen information kiosks, digital interactive television and the Internet, on a national and regional level. As part of these studies we have evaluated in detail individual consumer health Web sites SurgeryDoor and NHS Direct Online (Nicholas *et al.*, 2002a,b), and are currently evaluating another, MedicDirect. However, we have not attempted to survey the use of the Web as a whole in a UK consumer health information context. Therefore this paper represents a first step to evaluating what UK health consumers are doing online, which sites they visit and what are the main outcomes of using online health information. With so much investment and hope being expended in digital health there is a crying need to discover what are the impacts or outcomes of using today's digital information systems.

Literature review

It has been long established that health information is one of the most frequently sought topics on the Internet. Thus, Boseley (1999) estimated that "More than 40 per cent of all Internet users … have sought health-related information, making it second only to pornography in popularity." The consumer uptake of electronic health information has been truly phenomenal, and there is abundant evidence that this is the case, especially with regard to the USA. A Harris poll (Taylor, 2000) found that 98 million adults in the USA had used the Web to find health information. This was up 81 per cent from two years earlier, during which time the number of Internet users who had never looked for health information had declined from 29 per cent of all users to 14 per cent. In a more recent study, PEW Internet & American Life Project (2003) found that 70 million US adults had used the Web to get health or medical information (from looking for disease information to downloading fat-free recipes).

Reuters (2003) in an international study reported that on average 53 per cent of Americans used the Internet to search for health information. However, a survey by the Gale Group (2003) seems to be at odds with this. They found that 62 per cent of US adults did not seek health information from any source other than their doctor in the previous year and, further, that only 16 per cent of the population sought health information on the Internet. Of course, it is as well to remember that the online community is still a relatively small, but growing, subset of the total population. In the consumers' thirst for health information they will even go to sites once thought to be the sole domain of health professionals. Thus an average of 220 million searches are performed annually on the National Library of Medicine's Web site, of which an estimated one third are thought to be made by the general public (Wood *et al.*, 2000). It has been argued that "a driving force behind demand for online health information is the shortage of information easily obtained from traditional channels" (Miller and Reents, 1998).

With regard to Europe, a recent EU Eurobarometer survey on online health information (European Commission, 2003) found that across the EU nearly one in four Europeans (23 per cent) uses the Internet to obtain health information. However, the picture varies considerably between countries: in Denmark and The Netherlands around 40 per cent of people use the Internet for health information, while in Greece, Spain, Portugal and France usage is at 15 per cent or less. Health professionals, such as doctors and pharmacists, are still by far the most important source of health information for Europeans and the traditional media – television, newspapers, and magazines – still outperform the Internet. Other key findings of the survey are that medical and health organisations achieve the highest trust rating on health issues (84 per cent), while businesses and political parties receive the lowest (16 per cent and 11 per cent respectively).

In a very recent study of over 1,100 UK Internet users, Brown and Williams (2003) reported that 90 per cent claimed to have visited a Web site for health information and/or medical treatment in the past 12 months. Over 70 per cent of their respondents had reportedly visited a Web site for health or medical information or advice at least ten times during the previous year. Nearly half (49 per cent) had reportedly visited the National Health Service Web site, while over one in five (22 per cent) said they had visited a pharmaceutical company Web site.

There is clearly some debate about the effectiveness of online health information, although most researchers have come to the conclusion that it can be effective. However, on the negative side, Baker *et al.* (2003) in a survey of 4,764 people found that only 40 per cent had used the Internet and that 94 per cent of these said that the information found did not affect the number of times they visited a doctor. However, more positively, Kalichman *et al.* (2003) found evidence that Internet health-related information did have health benefits for people living with HIV/Aids. Members of the present research group (Nicholas *et al.*, 2001) have also carried out a survey on the use of information on the SurgeryDoor consumer health Web site (www.surgerydoor.co.uk) and found evidence of positive health outcomes as a result of using the service – in particular that 27 per cent of SurgeryDoor users (respondents) said they used the information instead of visiting the doctor. McKillen (2002) concluded that the Internet has had a positive effect on the doctor-patient relationship, a result also supported by Reuters (2003).

A study by PEW (2000) found that most people looked for medical information about a specific condition rather than for information about healthy lifestyles or health-care services, and a great many sought information on behalf of family and friends as well as for themselves. A total of 48 per cent said that the advice they found on the Web improved the way they took care of themselves and 55 per cent claimed that the Internet had improved the way they accessed health information. The vast majority of those seeking information for themselves found the information they located useful and educational and nearly half said that it affected their decisions about diet and exercise, treatments and about future take-up of health-care services. However, most people do not use the Web instead of visiting a doctor. It appears the majority go online after they have seen a doctor to gather further intelligence, confirming the need for, and benefit of, information as an adjunct to the doctor-patient relationship.

Women were more likely than men to seek online health information. The survey found that 63 per cent of women with Internet access had sought health information, against 46 per cent of men, with, on a typical day, 59 per cent of searches being carried out by women. Women, and in particular mothers, frequently adopt the role of health carers for their children and other family members. Health information seekers are predominantly of middle years (between the ages of 30 and 64) rather than from younger or older age groups. Not surprisingly, the longer someone has had Internet access, the more likely is it that they have looked for health information. A total of 42 per cent of users, once they have found a useful site, especially men, were likely to bookmark it for future reference. This still leaves a large proportion of health surfers.

Finally, the Internet health organisation Health on the Net Foundation's *Evolution of Internet Use for Health Purposes* (HoNF, 2001) survey found that the vast majority of Internet health information seekers searched for medical literature (83 per cent), with 67 per cent looking for the "description of a disease", and 38 per cent for clinical trial information.

Again in the UK, Brown and Williams (2003) reported that over nine out of ten of their respondents commented on the convenience of having immediate health information available via the Internet. Usage of the Internet for health was high across age groups and over other demographic groups and whether or not respondents indicated that they had recently experienced serious health problems themselves. Follow-up qualitative research indicated that Internet users surfed the Web for health information for general enquiries as well as when they suffered specific complaints or conditions. The same study revealed that, while seen as a useful resource, many survey respondents (70 per cent) questioned the accuracy of information they received over the Internet, and slightly more (72 per cent) expressed concerns about not being able to validate whether the information was credible. A significant minority of Brown and Williams' respondents (42 per cent) had other reservations about being able to interpret the information they found.

Interactivity is an important aspect of new communications technologies. However, the willingness of people to use interactive media for health purposes depends upon the application. Brown and Williams (2003) reported that most UK users of the Internet for health information they surveyed (82 per cent) said they would be willing to book an appointment with their doctor online, far fewer (33 per cent) were comfortable with the idea of dealing with their doctor remotely in this way and 29 per cent would be prepared to provide personal medical details to a medical Web site that provided diagnostic tools.

Hence, the Internet is seen as a valuable health information source, provided that the authority and credibility of the information can be assured or verified. It is also seen as having interactive potential, but more as an advanced information tool than as a diagnostic and treatment source.

Aims/objectives

This study sought to extend our knowledge concerning how UK residents used online health Web sites and to what ends. Specifically, the study aimed to discover: the proportion of people using health sites, information about the kinds of people that used online health Web sites, what particular sites they used, and the outcomes associated with using this online information. In particular the following information was sought about the British:

- likely audience reach of online consumer health information;
- gender, age and ethnicity variations in use;
- the uses to which digital health information is put;
- the type of online service used (i.e. online support groups, e-mail enquiry service);
- the outcomes associated with using online health information; and
- the Internet sites that are used.

A subsidiary aim was to highlight, where appropriate, the differences between UK and overseas Internet users.

Methods

An online questionnaire survey was carried out by The British Life and Internet Project[1], a research group, of which the authors are members, on a population of Internet users resident in the UK, yielding a sample of 1,322 respondents. Respondents were asked to provide information about their Internet-related health search behaviour. Those who indicated that they had used the Internet to search for online health information were then asked further questions as to their use of health Web sites and the outcomes associated with using the Internet for health information. All respondents provided self-report data on their Internet access history, and frequency of the Internet at home and at work, and personal details on their demography (sex, age, ethnicity, marital status). They provided information about access to computer equipment at home and where this equipment was located. They were then presented with a list of health-related behaviour questions and were asked in each case whether they had ever or never used the Internet for these purposes. The list contained a variety of content retrieval, interactive and transactional activities. Respondents were asked to say whether using the Internet had changed the way they obtain health information.

As with all online surveys, this one was dependent on a database of e-mail addresses. The British Life and Internet Project, of which this survey is a part, has compiled, with the help of *The Independent* newspaper, a database of 30,000 e-mail addresses. Members of this online universe were notified about the survey by e-mail containing a link to a Web-based online survey. It is not known if this sample is representative of the general UK population, although clearly *The Independent* attracts a particular broadsheet readership. Online respondents were self-selected volunteers. There was no opportunity to control respondent selection in advance to ensure randomness or to set quotas by key demographics. These caveats therefore need to be borne in mind when considering the data provided here.

Characteristics of sample

The data reported here were collected over a 24-day period from 2-26 May 2003. A total of 1,322 Internet users replied, giving a response rate of 4.4 per cent. However, responses comprised a wide demographic mix. In all, 59 per cent of respondents were male and 41 per cent were female. Respondents covered a range of age groups: 18-24 (10.6 per cent); 25-34 (19.0 per cent); 35-44 (24.0 per cent); 45-54 (24.3 per cent); 55-64 (15.2 per cent); 65-74 (5.6 per cent); and 75+ (1.4 per cent). Just under one in three respondents was single (31.3 per cent), nearly half were married (47.0 per cent), one in six was living with a partner (13.6 per cent), while the remainder were either divorced/separated (6.3 per cent) or widowed (1.3 per cent). About one in four (23.4 per cent) had children in their household aged up to 16 years. Most respondents (90.2 per cent) were ethnically white and of European origin. Others variously identified themselves as African (1.7 per cent), Caribbean (1.0 per cent), Arab (0.5 per cent), Indian/Pakistani/Bangladeshi (1.4 per cent), Chinese (0.7 per cent), Other Asian (1.0 per cent), or Other (3.5 per cent).

The characteristics of UK respondents were similar with regard to gender, 58 per cent being male and 42 per cent female, Though UK respondents were younger, 31 per cent were aged under 34 years. Fewer UK respondents were married and more were single: 46 per cent of UK respondents were married compared with 52 per cent of non-UK respondents. Of the respondents, 27 per cent said that their household included children. In addition there were marginally more UK respondents in full-time employment, 66 per cent compared with 62 per cent.

A total of 81 per cent of respondents came from the UK. This study predominantly examines UK users, although some international comparisons are made where appropriate. In fact, there were substantial differences between UK and non-UK respondents that require further discussion. It was found, for example, that non-UK respondents were more likely to be males (64.5 per cent) than UK respondents (54 per cent)[2]. Furthermore, non-UK respondents were more likely to be older – 11 per cent were aged between 65 to 74 compared with 5 per cent of UK 65 to 74-year olds[3]. Interestingly, previous literature has identified a high level of Internet use by US seniors (Gale Group, 2003). In addition non-UK users were more likely to be married: 54 per cent compared with 47 per cent of respondents from the UK were married[4]. Lastly, non-UK users were much more likely to report that they were in excellent health: 37.1 per cent confirmed this compared with 27 per cent of UK respondents[5].

A potential, but not surprising, bias in the sample should be noted. More respondents than expected said that they read broadsheet rather than tabloid papers. While respectively 27.5 per cent and 32.0 per cent of UK respondents identified themselves as *Independent* and *Guardian* readers, only 4.5 per cent of respondents said that they read *The Sun* newspaper and 5.4 per cent the *Daily Mirror*.

Results

Internet use

A total of 66 per cent of UK respondents accessed the Internet from home and 28 per cent from work; the remainder used a combination of work and home. Furthermore, 18 per cent had accessed the Internet within the last week, 50 per cent within the last month and 85 per cent in the last six months. Most UK respondents (49 per cent) accessed health information for themselves, 16 per cent for someone else, 10 per cent for another relative, 7 per cent for a parent, 7 per cent for a child and 7 per cent were just browsing.

Reach

Reach tells us the percentage of individuals who availed themselves of the service who potentially could have had accessed it (the population of subscribers). Reach indicates how well used a resource is in a particular community. This survey asked Internet users if they had ever used the Internet to look for health-related information. In all 80.5 per cent of respondents had used the Internet for this purpose. The percentage for UK only users was much the same at 80.3 per cent. However, this is likely to be an over-estimation, as the questionnaire was self-selecting and we would expect users of health information to be more willing to respond to the questionnaire.

The estimated reach figure was higher for women than for men: 88 per cent of women with Internet access had used it to find health information, whereas this was only true of 75 per cent of men[6]. Furthermore, younger users were less likely to use the Internet in this way: 70 per cent of those aged between 18 to 24 had done so compared with about 84 per cent of those aged 35 and over[7]. This could be down to the fact that young people are generally healthier or that they do not have the facilities to search the Web so regularly. Those living with a partner were found to be more likely to use the Internet to search for health information: 91 per cent said that they did so compared with 83 per cent of married respondents[8]. There was no significant difference between Caucasian and non-Caucasian respondents.

What do people do when they go online?

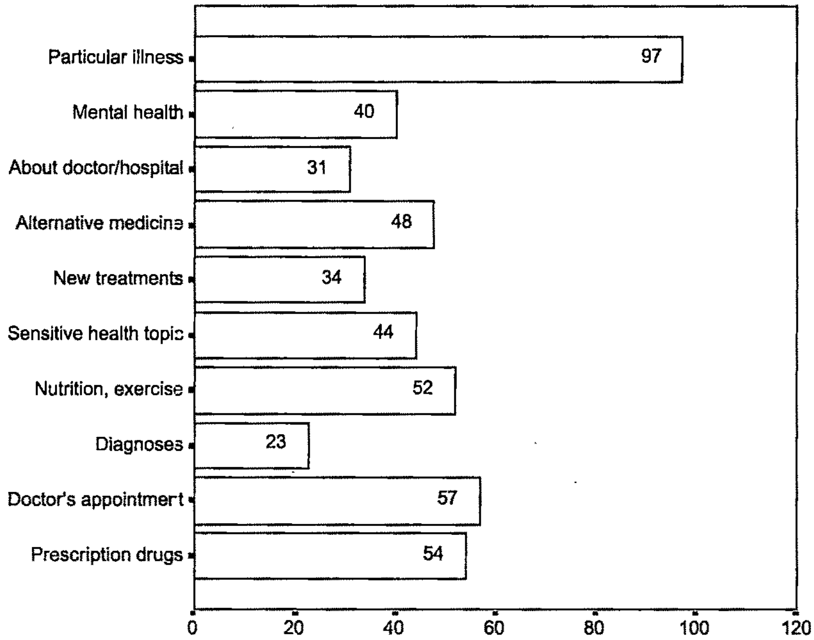
Clearly what people do online is important, as this gives us an idea of why people are searching the Internet. Respondents were given a list of things people were thought to do when online and asked to indicate if this is something they had done or not done. The results are given in Figure 1.

Almost all of the UK respondents (97 per cent) who had accessed the Internet for health information had done so to look up information about a particular illness and condition. In total 57 per cent had gathered information in respect of a visit to the doctor and 52 per cent had used the Web to look for information or advice about nutrition, exercise, or health weight control. Just under half of UK respondents had looked for information about alternative medicines; this must be regarded as a surprisingly high figure. Furthermore, 44 per cent had looked for information about a sensitive health topic that is difficult to talk about. This is significant in that many of these respondents would be unlikely to talk to a medical professional about these issues. A total of 40 per cent looked for information about a mental health issue like depression or anxiety and 34 per cent looked for information about innovative or experimental treatments. Only 23 per cent of respondents actually sought to diagnose or treat a medical condition.

Surprisingly, perhaps, more women said that they had accessed mental health pages: 49 per cent did so compared with 33 per cent of men[9]. Women were also more likely to access alternative remedy information: 57 per cent had done so compared with 41 per cent of men[10]. Women were more interested in accessing pages on nutrition, exercise and weight control: 62 per cent did so compared with 43 per cent of men[11].

There were large age differences too. Again, surprisingly, as those aged between 25 and 34 were more interested in mental health matters: 52 per cent had done so compared with 41 per cent of respondents in the 35 to 44 age group. Significantly, younger

Figure 1 Health information sought when online



respondents were more likely to be interested in using the Internet to access information related to a sensitive topic: 62 per cent of those aged under 34 had done so compared with 40 per cent aged 35 and over. Younger respondents were more likely to access information on nutrition, exercise and weight control: 64 per cent of those aged 34 and under had done so compared with about 50 per cent of those aged 35 and over. Those over 35 were more likely to use the Internet to look for information on prescription drugs: 60 per cent did so compared with about 45 per cent of younger respondents.

Non-Caucasian respondents were more likely to say that they had used the Net to look at mental health pages: 53 per cent did so compared with 39 per cent of Caucasian respondents[12]. They were also more likely to search for a sensitive topic: 60 per cent of non-Caucasians did so compared with 43 per cent of Caucasians[13]. In addition, non-Caucasian respondents were more interested in information leading to self-diagnosis: 35.1 per cent had done this compared with 22 per cent of Caucasian respondents[14].

Respondents searching for themselves were more likely to say that they had accessed a sensitive topic: 50 per cent did so compared with 34 per cent for those who did not[15], and regarding access to nutrition exercise and weight control pages 58 per cent compared with 42 per cent[16]. However, these people were less likely to look for new treatments: 31 per cent compared with 39 per cent[17] and less likely to access pages on prescription drugs: 51 per cent compared with 60 per cent[18].

Those people who rated themselves as being in poor or fair health were more likely to say that they had accessed mental health pages: 68 per cent and 52 per cent, respectively, said that they did so compared with 36 per cent of those who rated their health as excellent[19] Additionally, those in poor or fair health were more likely to look for information regarding a doctor's visit: respectively 74 per cent and 66 per cent did so compared with 49 per cent who said that they were in excellent health. Finally, those in poor or only fair health were more likely to have accessed prescription drug information: 83 per cent and 64 per cent respectively had done so compared with 46 per cent of people in excellent health[20].

There were some variations in behaviour according to the newspapers people said they read. Those reading *The Independent* were less likely to have looked at sensitive health information: 39.4 per cent compared with 47 per cent[21] had done so, and these readers were also less likely to have accessed alternative remedy information: 43 per cent compared with 51 per cent of non-*Independent* readers[22]. *Guardian* readers, however, were the reverse and were more likely to have accessed sensitive health topics: 51 per cent compared with 41 per cent had done so[23], and were more likely to have looked for alternative remedies: 53.6 per cent had done so compared with 45.2 per cent[24]. *Guardian* readers were more likely to search for a doctor or hospital: 37 per cent compared with 28 per cent of non-*Guardian* readers[25]. There was suggestive evidence that *Sun* readers were more willing to access pages related to nutrition, exercise and weight control.

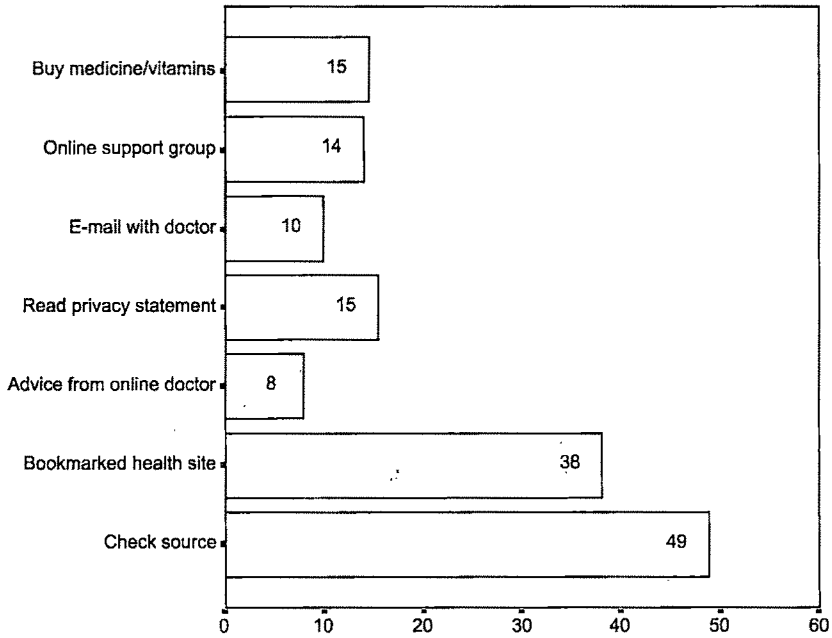
Married people were the least interested in nutrition, exercise or weight control: 46.6 per cent compared with 58 per cent of other groupings[26], and were least interested in looking at information on a sensitive topic: 36 per cent had done so compared with 50 per cent for non-married people[27]. There was suggestive evidence that full-time housewives were more interested in prescription drugs (72 per cent); while those in full-time education were least interested (40 per cent)[28].

Respondents were further asked about the online services and functions that they used (Figure 2).

Nearly half of all UK respondents looked to see what company or organisation was responsible for providing the advice or information that appeared on the health Web site. This indicates, surprisingly, that half did not and did not seem to be too bothered about the source of their information. Only just over a third of respondents (38 per cent) kept a health site "bookmarked", or saved as a "favourite place". This argues that health users are quite promiscuous: happy, for instance, to have a Web search engine make their choice for them. A total of 15 per cent bought medicine or vitamins online and only 15 per cent had clicked on a health or medical Web site's privacy policy to read about how the site uses personal information supplied to it. Of the respondents, 14 per cent participated in an online support group, 10 per cent used e-mail or had gone to a Web site to communicate with a doctor or doctor's office, while about 8 per cent actually described a medical condition or problem online in order to get advice from an online doctor.

This contrasts sharply with the expected or forecast take-up of specific online interactive services. Reuters (2003) reported that 45 per cent of Europeans would "like" to e-mail their doctor. While many people have indicated a willingness to make remote appointments bookings with their doctors, however, far fewer, as yet, are comfortable with remote diagnosis (Brown and Williams, 2003). The difference between expected and actual take-up might partly reflect the fact that many doctors and clinics do not currently offer patients e-mail contact. If this is the case, we would expect the percentage take-up figure to increase (as surveys are repeated), as more medical outlets offer e-mail or online facilities. Other reasons for the low take-up might be the unwillingness of users to

Figure 2 Online health services or functions used



communicate online with their doctor from a work situation where their actions can be viewed or monitored.

Older respondents were more likely to have bought medicine and vitamins online: 42 per cent of those aged 65 to 74 had done so compared with 14 per cent of those aged between 35 to 44[29]. There was suggestive evidence that those aged between 35 to 44 were more likely to join an online support group – 20 per cent of this age group had done so compared with 15 per cent of those aged between 45 and 50 and 9 per cent of those aged 25 to 34[30]. Those aged 34 and under were less likely to use a bookmark: about 34 per cent did so compared with 40 per cent of those 35 and over[31]. Older respondents were more likely to check the source. About 55 per cent of those aged 35 and over did so compared with 40 per cent aged between 25 and 34 and 25 per cent aged between 18 to 24[31].

Full-time housewives were more likely to buy online medicine and vitamins: 28 per cent had done so compared with 12 per cent in full-time employment[32]. There were no data to suggest that this was related in any way to having children. This group was also more likely to join online support groups: 44 per cent said that they had done so compared with only 13 per cent who were in full-time employment. Furthermore, full-time housewives were more likely to seek the advice of an online doctor: 22 per cent did so compared with 6 per cent in full-time employment[34]. Search disclosure (Nicholas *et al.*, 2003) describes the users' unwillingness to access sensitive information in locations where they may be observed by other people and this may account for the low take-up of online services by this group. Future research will clarify this.

Those people working from home were more likely to read the online privacy statement: 17 per cent said that they did so compared with 10 per cent of those who accessed from work. Perhaps, they just had more time. Further, those searching for information on a child's health were more likely to read a privacy statement: 26.4 per cent had done so compared with 14 per cent of those not searching for a child[35]. Those searching for themselves were marginally less likely to check the online source: only 46 per cent did so compared with 53 per cent[36].

Those people in poor health were more likely to bookmark a site: 58 per cent in poor health and 53 per cent of those who had fair health did so compared with 36 per cent of those in excellent health[37]. Those in poor health were also more likely to join an online support group: 60 per cent had done so compared with 15 per cent of those with only fair health and 11 per cent in excellent health[38] – suggesting, of course, that poor health is a driver for using support group facilities.

Outcomes

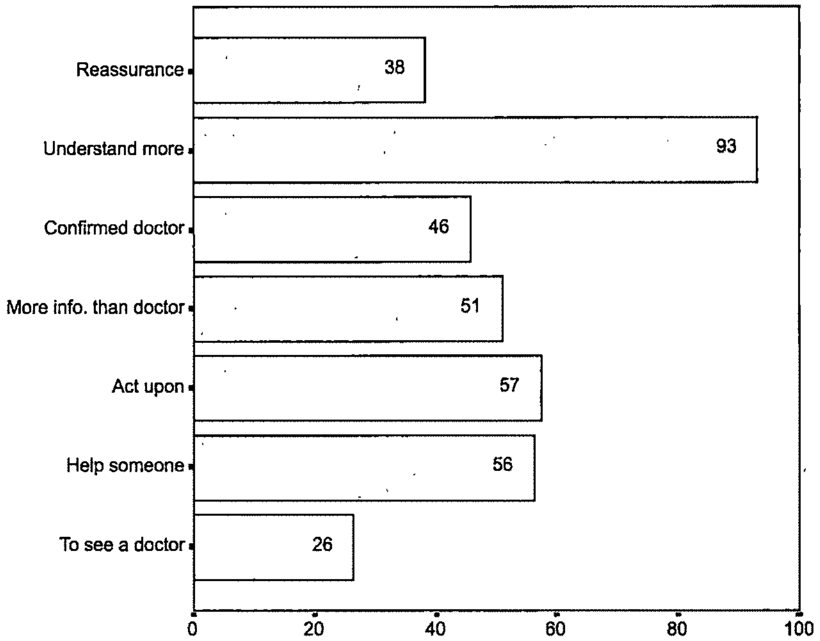
What are the benefits and outcomes of using online health information? The current survey indicated that there are many, with key applications shown in Figure 3.

A total of 93 per cent said that the information found had helped in understanding more about an illness or injury and a relatively high 57 per cent of respondents said that the information found was sufficient for them to act upon to improve their health. A total of 58 per cent said that information found enabled them to help someone else, while 51 per cent said that it gave them information that the doctor had not given them. Of the respondents, 46 per cent said that the information found had confirmed what the doctor had told them, while 38 per cent said the information found had given reassurance about recovery from an illness or injury. A total of 26 per cent said that the information found had affected their decision about whether to see a doctor.

In respect of the doctor, 38 per cent said that the information found had helped them ask new questions of the doctor, while 5 per cent said that they sought a second opinion based on the information found.

Older users said that the information found had given them more information than the doctor provided: 61 per cent of those aged between 45 and 54 said this compared with 31 per cent aged 18 to 24[39] This was also true for those in poor health: 74 per cent of those in poor health and 63 per cent of those in fair health said that the information found was more than that provided by the doctor. This was only true for 40 per cent of those in excellent health[40]. In addition those married or living with a partner were also likely to find more information on the Internet than that provided to them by their doctor: about 57 per cent of these two groups

Figure 3 Perceived benefits of Internet health information



said this compared with 43 per cent of single people.

Women were more likely to find information that helped someone else: 60 per cent said they had done so compared with 53 per cent of men[41]. This was also true of those respondents with children: 63 per cent said this compared with 53 per cent[42]. Older respondents also were found to be more likely to find information that helped someone else. About 60 per cent of those aged over 35 said this, compared with 46 per cent of those aged between 25 to 35 and 37 per cent of those aged 18 to 24[43]. This was further true of those in a relationship. A total of 58 per cent of those married or living with a partner had found information that helped someone else compared with 48 per cent of single users and 71 per cent of widowed, separated or divorced respondents[44].

Respondents in fair health felt most reassured by information found – 46 per cent felt reassured. Those in poor health felt the least reassured: only 11 per cent of this group felt reassured by the information found[45]. Both those in poor and in fair health said that the information found had confirmed what the doctor said. About 58 per cent of this group said the information found had done this compared with 49 per cent of those in good health and 33 per cent of those in excellent health[46].

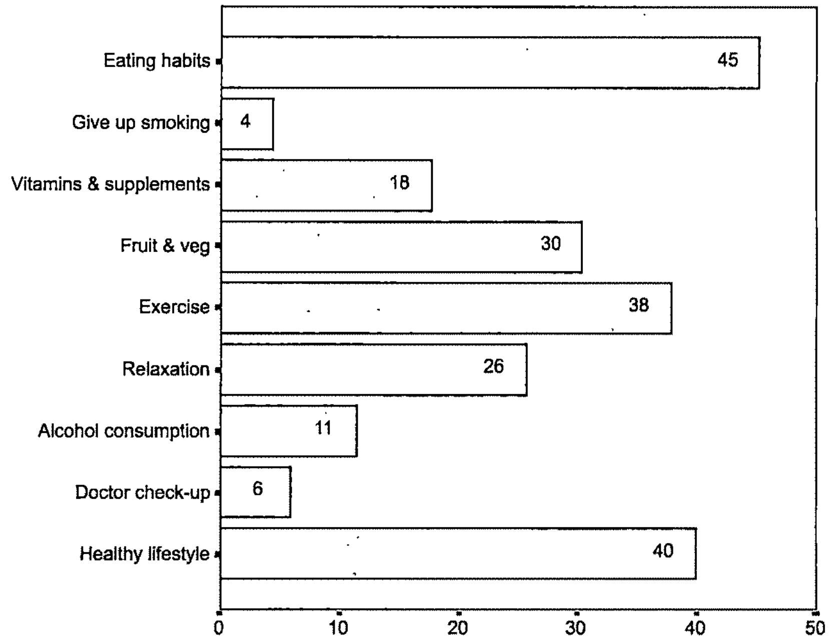
There was suggestive evidence that non-Caucasians were more likely to be reassured by the information found: 50 per cent were reassured compared with 36 per cent of Caucasian respondents[47].

Respondents were also asked if obtaining health and medical information on the Internet influenced them in changing their health-related behaviour. Figure 4 provides the results and appears to show that the Web has a beneficial impact.

Nearly half of the respondents (45 per cent) said that information found had caused them to think about the things they eat. A total of 40 per cent said that information found had made them more aware of the need to live a healthy life, while 38 per cent had said it encouraged them to take more exercise. Just under a third of users said that the information found led them to eat more fruit and vegetables, while 26 per cent said that it had encouraged them to relax more. Interestingly, Internet information seems to have the least impact on smoking and drinking habits. Only 4 per cent of respondents were influenced to give up smoking, while 11 per cent said that the information found had influenced the amount of alcohol consumed – probably showing how addictive are tobacco and alcohol. Six per cent said that the information found had caused them to go for regular health checks with their doctor.

There was evidence that the figures given above were even higher for those respondents outside the UK. For example, 65 per cent of

Figure 4 Behaviour that online information has changed



non-UK respondents said that they had found information that resulted in a change in eating habits. The outcome percentages for non-UK respondents were also higher for giving up smoking (9.7 per cent), taking vitamins (39.8 per cent), eating fruit and vegetables (54.1 per cent), exercise (57.1 per cent), relaxation (47 per cent), alcohol (18 per cent), check-ups (19 per cent) and a healthy lifestyle (60 per cent). It is not thought that UK respondents were necessarily poorer in taking up online information and these differences may reflect a sampling bias in non-UK Internet health users.

Women were more likely to have found information that led them to a change in diet: 50 per cent of women said so compared with 42 per cent of men[48]. Older respondents appeared more open to encouragement to take vitamins and supplements: 27 per cent of those aged 55 and over were encouraged to do so compared with 17 per cent of those aged 25 to 54[49]. Older and younger respondents said that the information found had helped them take more exercise: this was so for 53 per cent of those aged 18 to 24 and 44 per cent of those aged 55 to 74 compared with 32 per cent of those aged 35 to 54[50] .

There was some evidence that full-time housewives had found information that led to a change in eating habits, and this was true of 72 per cent of this group[51]. This group were also more likely to have found information that encouraged more exercise (67 per cent)[52], and relaxation (56 per cent)[53].

Those searching for themselves were more likely to say that the information found had resulted in them changing their behaviour; this was true for eating habits: (51 per cent said so), exercise (44 per cent), vitamins and supplements (21 per cent), relaxation (28 per cent) and a healthy lifestyle (45 per cent). Typically, the relationship is characterised as follows: 51 per cent of those searching for themselves had changed their eating habits compared with 38 per cent had done so but who did not say that they were searching for themselves[54].

Those in poor or fair health were more likely to say that the information found had encouraged them to relax more: 55 per cent of those in poor health and 32 per cent in fair health said so compared with only 21 per cent of those in excellent health[55].

There was suggestive evidence that *Sun* readers were more likely to have found information that resulted in them giving up smoking and drinking less alcohol. Of this group, 11 per cent had given up smoking compared with 4 per cent of non-*Sun* readers[56] and 23 per cent said information found had influenced the amount of alcohol consumed[57]. Suggestive evidence further indicates that these readers might be more likely to report that information found had led to a healthier lifestyle: 56 per cent of *Sun* readers said so compared with 39 per cent of non-*Sun* readers[58]. However, the sample is not representative of *The Sun* newspaper readers. There were only 36 respondents who were *Sun* readers and 15 of those also read *The Guardian* – further research is needed to clarify these findings.

Independent readers were less likely to find information that resulted in a change of eating habits: 41 per cent said so compared with 49 per cent of non-*Independent* readers[59].

Respondents were also asked if they ever went online instead of visiting a doctor or clinic: 28.5 per cent of respondents said that they had, but only once or twice. This figure is similar to that found in a study by Nicholas *et al.* (2001), where 27 per cent of users (respondents) of an online health site (www.surgerydoor.co.uk) said they had used online information found instead of visiting the doctor. With regard to the current study, a multivariate model found that those who used the Internet for diagnosis were nine times more likely to use online health information in this way compared with respondents who did not use the Internet for diagnosis[60]. In addition respondents who used the Internet to look up sensitive health information online were just under two and half times more likely to go online instead of visiting the doctor[61]. This seems to indicate that some users are doing this because they are actively avoiding a visit to the doctor. Further, that users will use online information found as a substitute for visiting the doctor and that people who do this have particular characteristics, needs and fears and online services need to cater for this type of online user and surrounding issues of this behaviour.

Health sites used

People were asked about the sites they visited. Figure 5 gives the sites that have ever been used by UK respondents. We should bear in mind that a previous analysis indicated that a lot of people never bookmarked their sites, so there is an issue of how accurately respondents might actually remember the sites they have visited.

The most accessed site, by some margin, was NHS Direct Online. Nearly two-thirds of all UK respondents had visited this site. The next most visited sites were Netdoctor (25 per cent) and Yahoo! Health (24 per cent).

Figure 5 indicates that 64 per cent of UK respondents who had used the Net to look for health information had used NHS Direct. This result cannot be generalised to the UK population of online users' search for health information. This is because the sample is heavily biased towards a *Guardian* newspaper readership – 33 per cent of the sample read this paper. The sample did not include many *Sun* readers (4.5 per cent), or *Daily Mail* readers (5.7 per cent). This is important as *Guardian* readers were found to be just under twice as likely to use the NHS Direct site, while *Sun* readers were half as likely to use the site[62]. That is, compared with *Sun* readers, *Guardian* readers were about four times more likely to use NHS Direct. Clearly, the performance of the NHS Direct site here significantly benefits from the skewed sample towards a *Guardian* readership.

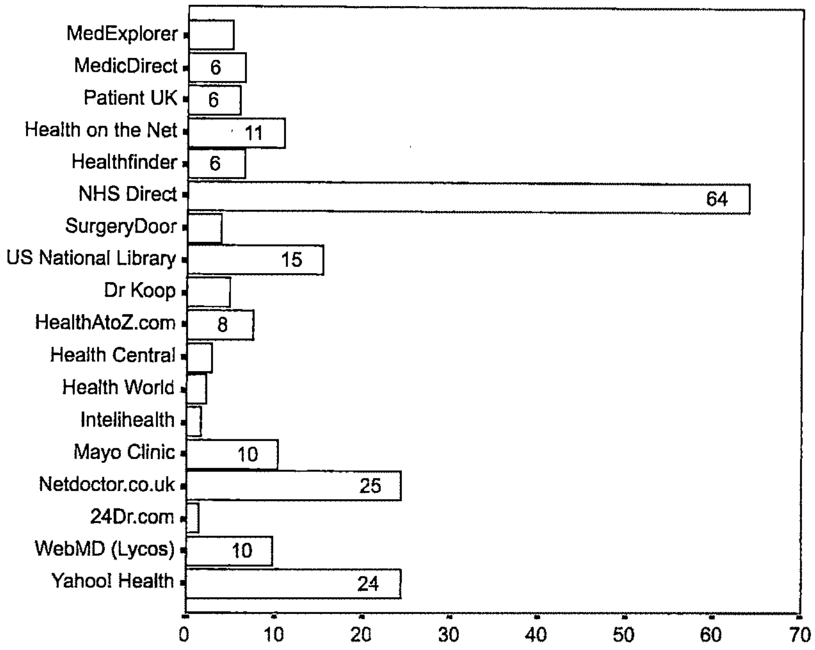
The high use recorded for NHS Direct in part reflects the sample bias towards *Guardian* readers. This bias will also impact on the performance of other sites. For example, in a recent survey of the SurgeryDoor site (Nicholas and Huntington, 2003) it was found that 21 per cent of respondents were *Daily Mail* readers, 12 per cent were *Sun* readers and only 9.9 per cent were *Guardian* readers. Clearly, the bias towards *Guardian* readers for the current study will weigh against a site like SurgeryDoor. Huntington *et al.* (2003) argued that different Web sites will attract different types of socio-economic user groups. They argue that no one site will appeal to all user groups, and that language, presentation and design differences between sites will mean that sites will attract different user groups. One way of describing user group differences is by the paper they normally read. The NHS site appears to attract more of a broadsheet – and less of a tabloid-type user.

Most people (53 per cent) visited between two to five of the listed sites, just over a third of respondents (35 per cent) had visited just one site, 10 per cent had visited between 6 to 10 per cent of the sites and 4 per cent had visited 11 or more of the listed sites.

Returnees

Coming back to a service constitutes conscious and directed use. People might arrive at a site by accident – and, of course, that constitutes "use", but they are unlikely to arrive at the same site again by accident. All this makes return visits a powerful performance indicator. The new media

Figure 5 Health Web sites visited



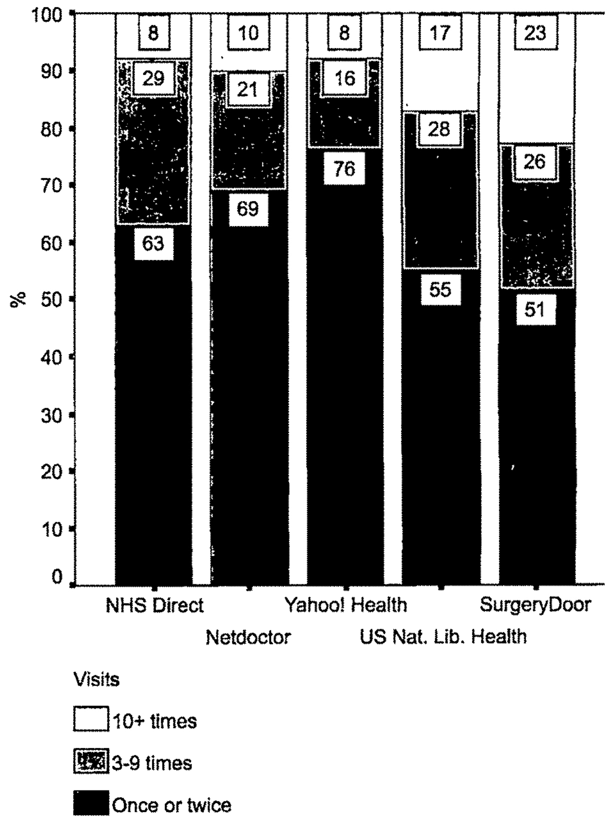
industry has referred to this phenomenon as Web site "stickiness". A site with a high percentage of returnees can be regarded as having a "brand" or loyal following. All this makes return visitors a powerful performance indicator.

It seems likely that the more times a user returns to the site, the more likely they are to be satisfied with the site – and this is indeed what Morris (1997) found. The idea of satisfaction is linked to the likelihood of a user returning to the site. Thus, if a user makes one visit to a Web site and does not return, then it might be argued that the user has voted with their feet. Figure 6 shows the users' repeat behaviour over five selected sites visited.

In terms of repeat use Yahoo! Health performs poorly and recorded the least proportion (24 per cent) of users willing to come back three or more times to the site. SurgeryDoor, on the other hand, performed particularly well by this metric – about half its users returned to the site three or more times – obviously liking what they saw.

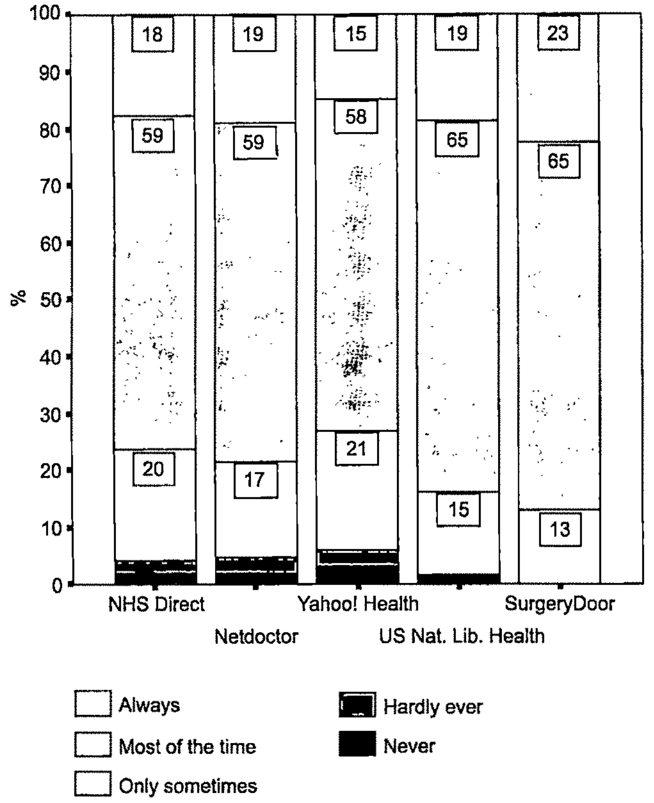
These figures are broadly matched by ratings of how useful was the information found in each site. Figure 7 shows how useful respondents found the information by sites visited. Of the respondents, 88 per cent who had used the SurgeryDoor site said that information found was either always or mostly useful, but this was only true for 73 per cent of respondents who had used the Yahoo! Health site.

Figure 6 Number of times visited five Web sites



It was decided to look more closely at the NHS Direct site by looking at respondents who had used the site according to whether the information found had influenced or changed their behaviour. The question asking whether information found had changed behaviour

Figure 7 Usefulness of information found by sites visited

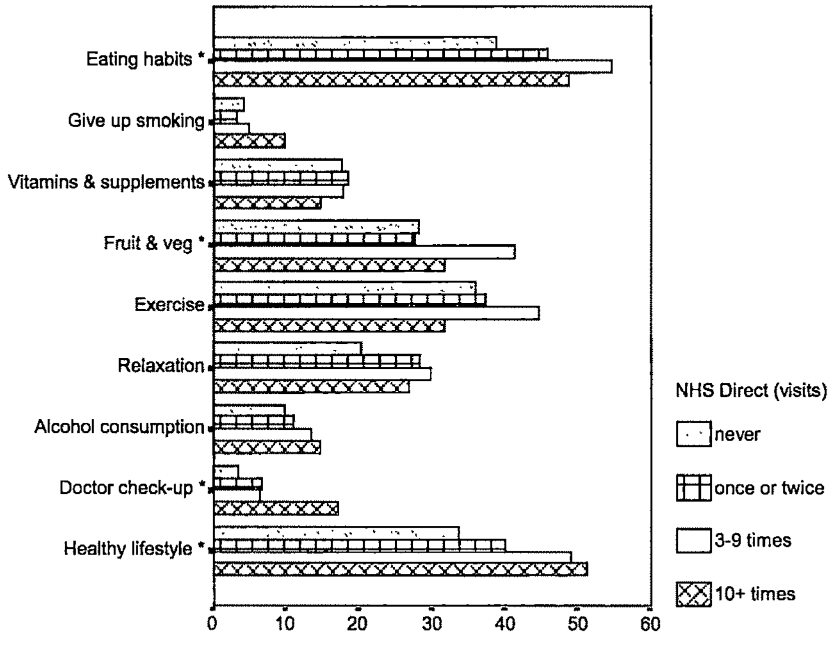


followed the question related to sites used. The result for NHS Direct is given in Figure 8.

Of the nine health options, NHS Direct had an impact on the behaviour with regard to four: eating habits, fruit and vegetables, having regular doctor check-ups, and having a healthy lifestyle. Those who had used NHS Direct had found information that had encouraged them to change their eating habits, this being more true, the greater the number of visits to the site, except those visiting ten or more times. Further, respondents who had used NHS Direct had increased their consumption of fruit and vegetables (but only for those visiting the site three to nine times). These respondents were also more likely to have increased their visits to the doctor; however, this again was only true for respondents visiting the site ten or more times. NHS Direct users (respondents) were also more likely to adopt a healthy lifestyle. This was more true, the greater number of times the user visited the site.

It was thought that the greater the number of sites visited, the greater the likelihood of a healthy behaviour outcome. This is based on an information model that argues that not all sites will present the information in the same way, detail or in the same design. Users "benefit" from collecting information from a number of sites, partly because they find the information easier to digest on some sites than others, and partly because the process of jumping from site to site means that users can compare and contrast information, and this says something about how users become knowledgeable. To look at this in more detail it was decided to look at outcome as estimated by a change of behaviour by the

Figure 8 Perceived impact of Internet information on health-related behaviour by visits to NHS Direct



Note: Significant relationships marked: * 0.05, ** 0.01, *** 0.001

number of sites visited; the results are given in Figure 9.

Out of the nine options impacting on health behaviour those that had visited more sites had a healthier outcome on seven of them. There was no outcome on smoking and drinking habits. The impact on some outcomes is considerable; for example, over 90 per cent of those visiting ten or more sites said that the information found had changed their eating habits. There does appear to be evidence linking the number of sites a user visits with health outcomes.

Conclusions

The vast majority of respondents (80.3 per cent) had used the Internet to look up health information. This figure was higher for women than for men. Furthermore, younger users were less likely to use the Internet in this way, partly because they had a lesser health need and partly because they were not as Web-familiar as the more practised users.

Clearly, people were attempting to get some of the information for which one might have originally gone to the doctor. Thus, 97 per cent who had accessed the Internet for health information had done so to look up information about a particular illness or condition. They were also using this information to enhance the patient-doctor relationship: 57 per cent were searching for information regarding a visit to the doctor; 52 per cent were looking for nutrition, exercise, or weight control information.

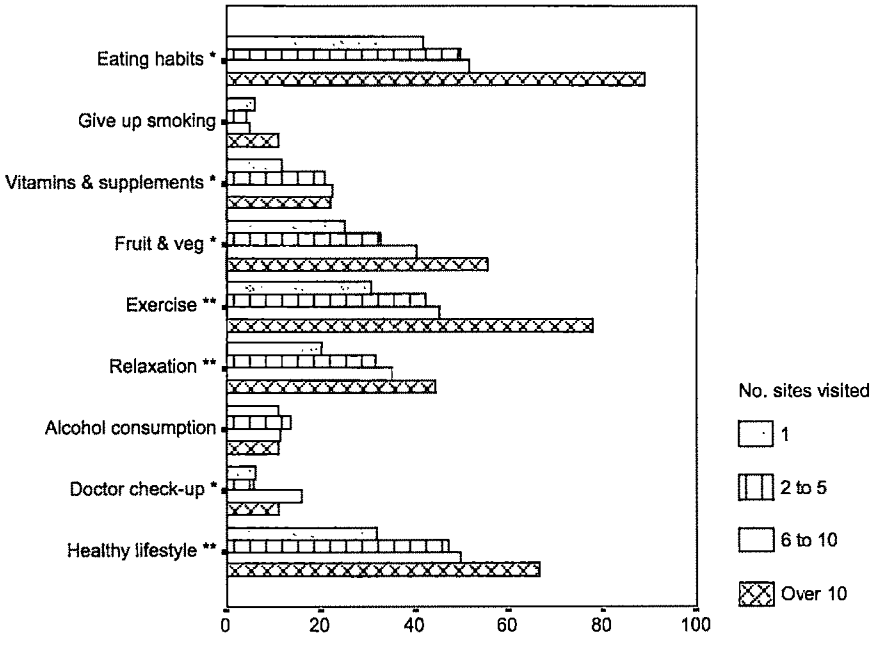
Respondents searching for themselves were more likely to say that they had accessed a sensitive topic: 50 per cent compared with 34 per cent. Non-Caucasian respondents were more interested in information leading to self-diagnosis: 35.1 per cent had done this compared with 22 per cent of Caucasian respondents.

Only about half of UK respondents (49 per cent) looked to see what company or organisation was providing the advice or information that appears on a health Web site.

In terms of online services used, 14 per cent of respondents participated in an online support group, 10 per cent used e-mail or had gone to a Web site to communicate with a doctor or doctor's office. About 8 per cent of UK respondents actually described a medical condition or problem online in order to get advice from an online doctor. Those respondents aged between 35 to 44, housewives and those in poor health were more likely to join an online support group.

A total of 93 per cent said that the information found had helped in understanding more about an illness or injury. Further, a relatively high 57 per cent of respondents said that the information found

Figure 9 Perceived impact of Internet information on health-related behaviour by number of different sites visited



Note: Significant relationships marked: * 0.05, ** 0.01, *** 0.001

was sufficient for them to act upon to improve their health, while 57 per cent said that they had found information that helped someone else.

Nearly half of the respondents (45 per cent) said that information found had caused them to think about the things they eat. Further, 40 per cent said that information found had made them more aware of the need to live a healthy life, while 38 per cent had said it encouraged them to take more exercise. Those in poor or only fair health were more likely to say that the information found had encouraged them to relax more. There was suggestive evidence that *Sun* readers were more likely to have found information that resulted in them giving up smoking and drinking less alcohol.

Well over a quarter (28.5 per cent) of respondents said that they had gone online instead of visiting a doctor or clinic. Respondents who went online for a diagnosis or who used the Net to look up sensitive health information were also more likely to go online instead of visiting a doctor or clinic.

Notes

1 The British Life and Internet Project is operated by a consortium of researchers from the University of Sheffield, City University, eDigitalResearch.com, and *The Independent* Newspaper Group.
2 6.8 1 df 0.009
3 22.6 6df 0.001
4 9.5 3df 0.023
5 8.4 3df 0.038
6 24 1df 0.000
7 13.2 6df 0.04
8 25.5 3df 0.000
9 20.2 1df 0.000
10 20.8 1df 0.000
11 26.6 1df 0.000
12 3.9 1df 0.049
13 5.7 1df 0.017
14 5.5 1df 0.019
15 19.4 1df $p = 0.000$
16 19.4 1df $p = 0.000$
17 4.6 1df $p = 0.032$
18 7.0 1df $p = 0.008$
19 14.5 3df $p = 0.002$
20 16.1 3df 0.001
21 4.3 1df 0.038
22 5.6 1df 0.018
23 6.8 1df 0.009
24 5.0 1df 0.025
25 7.3 1df 0.007
26 8.9 3df 0.030
27 19.4 3df 0.000
28 14.7 4df 0.005
29 35.5 6df 0.000
30 12.3 6df 0.056
31 18.2 6df 0.006
32 33.9 6df 0.000
33 9.9 4df 0.043
34 19.2 4df 0.001
35 7.5 1df 0.006
36 4 1df 0.045
37 14.2 3df 0.003
38 32.5 3df 0.000
39 20.0 6df 0.003
40 20.6 3df 0.000
41 3.7 1df 0.054
42 5.2 1df 0.023
43 22.7 6df 0.001
44 11.1 3df 0.011
45 10.9 3df 0.012
46 21.6 3df 0.000
47 4 1df 0.045 Fischer's = 0.06
48 5.6 1df 0.018
49 11.8 6df 0.068
50 15 6df 0.02
51 9.2 4df 0.057
52 13.4 4df 0.01
53 13.1 4df 0.011
54 11.4 1df $p = 0.001$
55 12.2 3df 0.007
56 Fischer's $p = 0.067$
57 Fischer's $p = 0.054$
58 Fischer's $p = 0.081$
59 4.4 1df 0.037
60 B = 2.217 Exp(B) = 9.17 Wald = 111.1 1df $p = 0.000$
61 B = 0.867 Exp(B) = 2.37 Wald = 20.4 1df $p = 0.000$
62 *Guardian* Exp(B) = 1.76** SE = 0.17
Sun Exp(B) = 0.51t SE = 0.36

References

Baker, L., Wagner, T.H., Singer, S., Bundorf, M. and Jama, M.K. (2003), "Use of the Internet and e-mail for health-care information: results from a national survey", *The Journal of the American Medical Association*, Vol. 289 18, 2400 No. 7, 14 May.

Boseley, S. (1999), "Web life: health", *The Guardian*, Online section, 16 December, p. 5.

Brown, J. and Williams, D. (2003), "A Web site a day keeps the doctor away: will the Internet bring a new doctor-patient paradigm?", paper presented to ESOMAR Global Health Care 3 Conference, Citigate DVL Smith, London, available at: www.citigatedvl.co.uk

European Commission (2003), *Survey of Online Health Information*, available at: europa.eu.int/comm/health/phinformation/indicators/pubindicdataen.htm (accessed 10 June).

Gale Group (2003), "Most people do not seek health information online", *Mental Health Weekly*, 13, 12, 7, No. 1, 24 March.

Health on The Net Foundation (HoNF) (2001), *Evolution of Internet Use for Health Purposes*, February/March, available at: www.hon.ch/Survey/FebMar2001/survey.html (accessed 4 June 2003).

Huntington, P., Nicholas, D. and Williams, P. (2003), "Characterising and profiling health Web user and site types: going beyond 'hits'", *Aslib Proceedings:*

New Information Perspectives, Vol. 55 No. 5/6, pp. 277-89.

Kalichman, S.C., Benotsch, E.G., Weinhardt, L., Austin, J., Luke, W. and Cherry, C. (2003), "Health-related Internet use, coping, social support and health indicators in people living with HIV/Aids: preliminary results from a community survey", *Health Psychology*, Vol. 22 No. 1, pp. 111-16.

McKillen, D. (2002), "Four-nation survey confirms growing acceptance of online health information medical marketing and media", *Boca Raton*, Vol. 22 No. 7, pp. 10-12.

Miller, T.E. and Reents, S. (1998), *The Health Care Industry in Transition: The Online Mandate to Change*, Internet Strategies Group, Cyber Dialogue, New York, NY, available at: www.cyberdialogue.com/pdfs/wp/wp-cch-1999-transition.pdf

Morris, B. (1997), *Managing Commercial Web Sites*, available at: webdevelopersjournal.com/articls/managing.htm (accessed 4 June 2003).

Nicholas, D. and Huntington, P. (2003), "Results from an online survey of SurgeryDoor" (draft paper).

Nicholas, D., Huntington, P. and Williams, P. (2000-2003), "The Web, the kiosk, digital TV and the changing and evolving face of consumer health information provision: a national impact study", DoH.

Nicholas, D., Huntington, P. and Williams, P. (2002a), "Evaluating metrics for comparing the use of Web sites: case study: two consumer health Web sites", *Journal of Information Science*, Vol. 28 No. 1, pp. 63-75.

Nicholas, D., Huntington, P., Williams, P. and Blackbum, P. (2001), "Digital health information and health outcomes", *Journal of Information Science*, Vol. 27 No. 4, pp. 265-76.

Nicholas, D. Huntington, P., Williams, P. and Gunter, B. (2001-2002), "An evaluation of pilot projects exploring the health applications of digital interactive television", DoH.

Nicholas, D., Huntington, P., Williams, P. and Gunter, B. (2003), "'Search-disclosure': a concept to aid the understanding of digital information platform preference and location in a health environment", *Journal of Documentation* (in print).

Nicholas, D., Huntington, P., Williams, P. and Jordan, M. (2002b), "NHS Direct Online: its users and their concerns", *Journal of Information Science*, Vol. 28 No. 4, pp. 305-19.

PEW (2000), *Pew Internet and American Life Report: The Online Health Care Revolution: How the Web Helps Americans Take Better Care of Themselves*, available at: www.pewinternet.org/reports/reports.asp?Report=26&Section=ReportLevel2&Field=Level2ID&ID=134 (accessed 13 June 2003).

PEW Internet and American Life Project (2003), "Internet visits soaring", *Health Management Technology*, Vol. 24 2 8 No. 1, February.

Reuters (2003), "Reuters consumer-targeted Internet investment: online strategies to improve patient care and product positioning", *Reuters Business Insight*, May.

Taylor, H. (2000), "Explosive growth of 'cyberchondriacs' continues", *The HARRIS Poll*, August, Harris Interactive, New York, NY, available at: www.harrisinteractive.com/harris_poll/index.asp?PID=104 (accessed 4 June 2003).

Wood, F.B., Lyon, B., Schell, M.B., Kitendaugh, P., Cid, V.H. and Siegel, E.R. (2000), "Public library consumer health information pilot project: results of a National Library of Medicine evaluation", *Bulletin of the Medical Library Association*, Vol. 8 No. 4, pp. 314-22.

Characterising and profiling health Web user and site types: going beyond "hits"

Paul Huntington
David Nicholas and
Peter Williams

The authors

Paul Huntington is Research Fellow, **David Nicholas** is Professor and **Peter Williams** is Research Fellow, all at the Centre for Information Behaviour and the Evaluation of Research (CIBER), Department of Information Science, City University, London, UK.

Keywords

Health services, User studies, Worldwde web, Customer profiling

Abstract

Identifies Internet health user types according to three factors: site attributes most favoured, health topics most sought, and the health sites they visited. Knowing what type of consumer uses a site is important, as this should inform menu structure and provide an understanding of why certain kinds of people visit certain sites. Web sites even in the same field will not appeal to all users. Much of this differentiation will come down to design and feel of the site, although site attributes and information needs also impact here. Data were obtained from an online questionnaire placed on the SurgeryDoor Web site, a site which provides consumer health information. In all a total of 1,068 responses were received. Shows that useful groupings can indeed be constructed. Users were also classified according to additional health sites visited, also a preference metric, and this additionally is related to site attribute preferences, information needs and user characteristics.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · pp. 277-289
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310498851

Introduction

There has been much investment in providing consumers with health information on the Web. Indeed, the UK Government has proved to be a major investor with its NHS Direct Online Web site. The rapidly expanding NHS site and its numerous commercial and non-commercial rivals have proved exceedingly popular, if the number of "hits" they attract are anything to go by. Thus, in the case of the SurgeryDoor site over the period October 2001 to September 2002 3,680,453 pages were viewed (excluding declared robots). As part of a three-year investigation (Nicholas *et al.*, n.d.) on behalf of the Department of Health we have been evaluating the use and impact of a number of UK sites, including NHS Direct Online and the commercial SurgeryDoor Web site, although in fact many were "promiscuous" users visiting a number of other health Web sites – about which we also sought data.

The prime purpose of this particular study is to go beyond the headline hit figures and to identify and profile meaningful groups of health users, using a variety of criteria. This should help Web site managers to target their services more effectively, something that is beginning to concern them as they move towards providing a new range of personalised services. Without such an analysis there is a real danger that site owners (and consumers) will find themselves lost in the digital information fog. Site owners need to move on from hit counting and start obtaining meaningful user data. Most importantly, they need these data to help in menu and content construction, in that menus and content can be structured around identified information need groups. Menu and content structure could then reflect actual user interest rather than the producers' or the site designers' interest. Further, knowing more about user profiles and their site use leads to questions about a site's information provision, presentation and also to a classification of sites. This can be thought of as working towards a classification that we are happy to apply in traditional media, for example, when referring to broadsheet and tabloid papers. The study described here constitutes a step towards such classifications.

Aims and objectives

The purpose of the paper is to identify and distinguish meaningful groups of Internet health consumers. This is necessary because there are so many consumers (millions, probably) searching on such a range of health matters that generic health sites can never hope to meet all their needs as they are currently configured. Using feedback obtained via an online questionnaire mounted on a leading consumer health Web site, SurgeryDoor, and employing a range of statistical measures, we sought to examine the characteristics of the respondents and then categorise them according to these characteristics.

Literature review

Little work appears to have been undertaken in exploring the characteristics of Internet health seekers – the literature is, rather, preoccupied with issues of quality (e.g. Impicciatore *et al.*, 1997) or accessibility (e.g. Eysenbach and Köhler, 2002). A wealth of literature has accumulated on the classification of Web use health information needs, although they have largely been concerned with the categorisation of Web documents (Norbert *et al.*, 1999; Oates and Gibson, 2003). Health on the Net Foundation (HoNF) (1999) and the Pew Foundation (2000) have carried out a number of Internet surveys of health information consumers. However, these are reports on monitoring the basic statistics of the Internet health community and users over time by age and gender.

For example, the Pew Internet & American Life Project did identify "health seekers" (55 per cent of the Internet-user population) (Pew Foundation, 2000). Among the health seekers, 29 per cent go online weekly for medical information and 30 per cent monthly, while HoNF has found that a "steady advance of female users of Web-based health-care information" no longer applies (HoNF, 1999).

In an early non-digital study Pinder (1990) developed a typology of health information seekers on the basis of how sufferers and carers coped with the onset and development of Parkinson's Disease. Three categories of user were identified – "seekers", "weavers", and "avoiders". The former sought as much information as possible, and used it as a central weapon in coping with the disease. Weavers sometimes sought information, and were selective about what they took on board. Avoiders believed that "the anxiety of not knowing was preferable to having their ... fears about the condition confirmed". Leydon *et al.* (2000) in their study of cancer patients also found some reluctance to seek information. Huntington *et al.* (2002) in a study of text-based health information broadcast over a digital interactive television project identified four user types: active traditional media users, passive traditional media users, electronic passive/isolated users, and electronic sociable users. In particular, the paper identified new user types willing to explore health information via a DiTV platform. These users had not previously made use of this type of information. The authors raised the question as to the extent to which health information providers could use identified user groups to target specific users.

Cyber Dialogue (2000) found that approximately half of all Internet-using health information seekers advised a family member or friend to see a doctor, changed their exercise or eating habits or made a "positive" decision related to their health treatment. A rather mixed bag of information need is shown in these results, with seekers looking for information on behalf of others, to improve their general health or to decide on the next steps they should take with regard to a current condition. Many others joined an illness support group after visiting a disease-specific Web site. Some work has been carried out on the impact of the Internet on such specialist online groups. Gann (1998) reports, for example, that participation in these forums focused around peer support, sharing of information on treatment advances and clinical trials.

As with much else on the Web, it is often the marketers and consultancies which are leading the way in usage research, albeit in a fairly superficial way and with commercial rather than altruistic or academic ends. The Internet generation has been identified as being critical, demanding and sophisticated (Modalis, 2001). Further, marketers have categorised Internet users into economic groupings, such as the e-fluential "online movers and shakers" (Burson-Marsteller, 2000), while Jepsen and Dipnall (2003) looked at the classification of Internet use on ethical lines. One interesting study looking at online health information seeking has been that carried out by the Boston Consulting Group (BCG, 2001; Poensgen and Larsson, 2001) with European health consumers. Their researchers found that users tend to have a focused and deep interest in information only about their specific condition or disease. They do not regularly surf the Web for general health-related material, but want sites offering specific information, and show little interest in using the Web to obtain general health-related information or products. Those more actively involved in their diagnoses and treatment decisions are more likely to use the Internet as a resource for information.

Methods

Data for the project were obtained from an online questionnaire hosted on the SurgeryDoor Web site[1] for the month of November 2000. In total 1,068 users answered the questionnaire, which represented 5 per cent of the 21,118 visitors (as denoted by unique IP addresses) to the site in November 2000. All questions were closed questions and covered a variety of topics including age, gender, income and family circumstance, views on site attributes and the health information needs of the user. A total of 32 per cent of respondents were aged under 34, 50 per cent were aged between 35 and 54 and 18 per cent were aged 55 and over. SPSS was used to analyse the data.

Platform background

The consumer health information company, InTouch with Health, owns the publicly accessible Web site www.surgerydoor.co.uk (Figure 1). The site is frames-based, and has menus on both the left and right frames (with "content" displayed on a middle frame). When it was launched on 27 January 2000, SurgeryDoor became the UK's first Internet health portal offering electronic versions of official NHS information, and the country's biggest online health multi-store UK-specific health Web site (M2 Presswire, 2000).

The site features targeted sections providing health advice for groups such as 'teens, carers, women, travellers and disabled groups. Site content is divided into the following sections, each of which appears as main content entries on a side-bar and contain a series of subheadings:

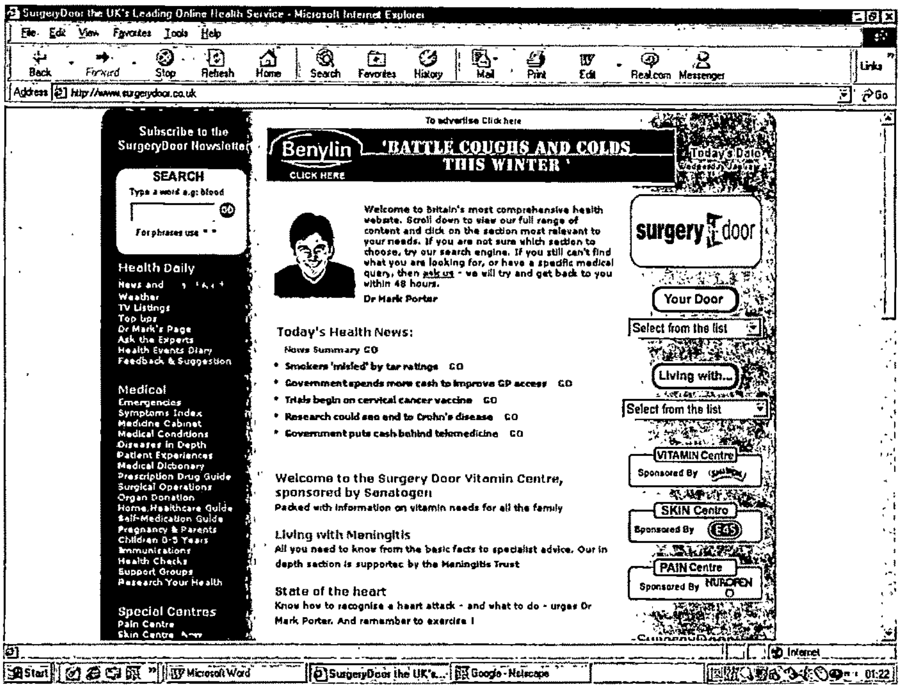
- *Health Daily.* Consisting of such things as a news and health alert, weather, tips (such as "what to look for when considering joining a gym"), and feedback and suggestions.
- *Medical.* The first entry of which is "Emergencies", and gives basic information on such things as bleeding, scalding etc. A "Symptoms Index" leads to the National Health Service online booklet *Home Healthcare Guide*, embedded in the SurgeryDoor window. Other content under the main "Medical" entry includes accounts of "Diseases in Depth", a "Medical Dictionary" and a Prescription Drug Guide.
- *Healthy Living.* Including such topics as Preventing Accidents, Dental Health Drugs and advice on alcohol consumption.
- *NHS & Benefits.* Much of the content for this section is taken from the Government Benefits Agency and, indeed, appears to be pages directly from its own Web site.
- *Complementary Medicine.*
- *Travel Health.* Including vaccination advice and Traveller's Health Kit (a list of items that may be useful during a holiday).
- *Community & Fun.* Consisting of the interactive elements of the site and current health information. Content includes: "Patient experiences", "SurgeryDoor Health Magazine", feedback and suggestions, health surveys, quizzes and competitions.
- *Shopping.*
- Today's *Selection of Features and Topics.* Featured topics and articles such as "Living with Asthma" and "Hypnosis – its place in medicine today".

Results

Satisfaction with the key attributes of the SurgeryDoor site

Figure 2 shows how the SurgeryDoor users who responded rated nine attributes of the

Figure 1 SurgeryDoor Web site



Welcome to Britain's most comprehensive health website. Scroll down to view our full range of content and click on the section most relevant to your needs. If you are not sure which section to choose, try our search engine. If you still can't find what you are looking for, or have a specific medical query, then ask us - we will try and get back to you within 48 hours.
Dr Mark Porter

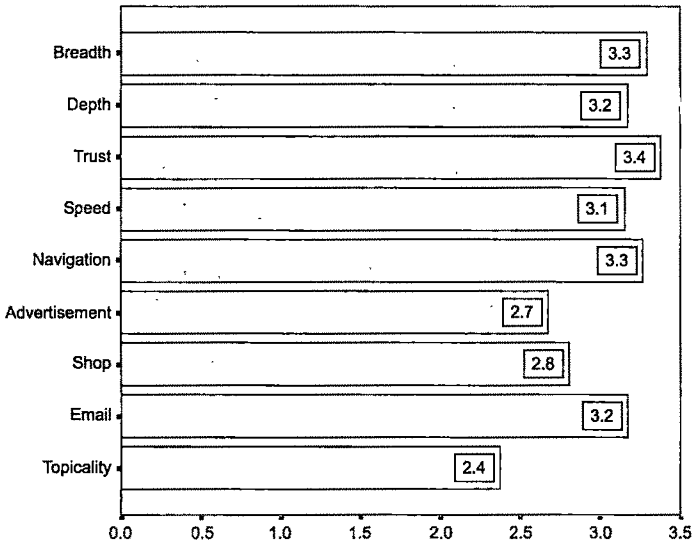
Today's Health News:
News Summary GO
- Smokers 'misled' by tar ratings GO
- Government spends more cash to improve GP access GO
- Trials begin on cervical cancer vaccine GO
- Research could see end to Crohn's disease GO
- Government puts cash behind telemedicine GO

Welcome to the Surgery Door Vitamin Centre, sponsored by Senatogen
Packed with information on vitamin needs for all the family

Living with Meningitis
All you need to know from the basic facts to specialist advice. Our in depth section is supported by the Meningitis Trust

State of the heart
Know how to recognise a heart attack - and what to do - urges Dr Mark Porter. And remember to exercise !

Figure 2 Rating SurgeryDoor attributes



site, including breadth of content, trust in the site, ease of navigation and advertisements on the site. They rated each characteristic out of 4, where 4 was very satisfied and 1 very unsatisfied. Trust (3.4) was rated most highly. We might have expected this, as clearly these were users of the site and they would hardly be users if they did not trust the site, especially in the case of a health site. Breadth of content and site navigation were similarly highly thought of (3.3). The least satisfactory characteristics proved to be e-commerce opportunities (2.8), advertisements (2.7) and topicality (2.4). We might expect advertisements and shopping to score poorly – clearly some users were annoyed by these functions on a health site, and the dissatisfaction with currency shows the demanding nature of the digital health consumer.

Categorising users according to site characteristics most rated

Not all users will respond or relate to site attributes in the same way, and it would be valuable to type them according to the characteristics to which they do relate. Of course, some attributes might be seen to conflict with one another – for example, ease of navigational structure and breadth of content. There are conflicts between other characteristics as well; for example, our previous research (Nicholas *et al.*, 2003) has found that where advertising is obtrusive there is a reduction in perceived trustworthiness in the site.

A factor analysis, which identifies uncorrelated or independent combinations of variables on the responses on how users rated each attribute, was conducted to see if meaningful groupings could be found. The results are reported in Table I. Three groups could be identified: those that rated content attributes, those that rated what we can term site facilities (e-mail, etc.) and those that thought most highly of system attributes, like speed of response/download. These three

Table I User types by attributes

	Attribute factors		
Characteristic	**Content (21% of variance)**	**Facilities (20% of variance)**	**System (19% of variance)**
Breadth of content	0.785		
Depth of content	0.757		
Trust in content	0.486		
Speed of delivery			0.773
Navigation ease			0.661
Advertisement		0.627	
Shopping facility		0.806	
E-mail facility		0.451	

Notes: Principal axis factoring, Varimax rotation, Topicality dropped on the basis of a low communality score. Factors, given in parentheses, scores greater than 0.4 included

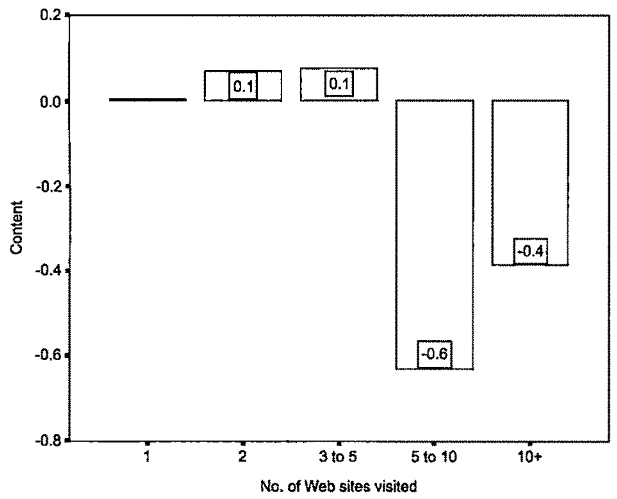
groupings explained about 60 per cent of the variance related to these variables.

Site visitors who favoured "content" were interested in breadth, depth and trust of content. Users most interested in "facilities" were happy with advertisements, shopping and e-mail facilities, while "system people" related favourably to the characteristics of speed of delivery and navigational ease.

An important relationship was found between the user's score on the content attribute (breadth, depth and trust) and the number of different health sites visited. The user's rating fell, as the number of sites visited increased (Figure 3). This suggests that there is a group of people that believe they have to visit many a site to find what they want. We call these people site checkers or evaluators. They largely do this checking on the basis of long experience with searching the Web, practice in making constant comparisons and a process of trial and error. The Web provides huge opportunity to "suck it and see" and these people take advantage of this.

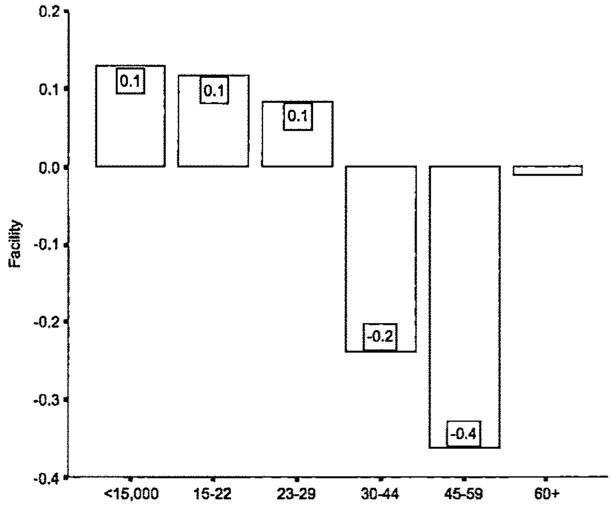
A relationship was also found between facility preference (i.e. for advertisements, shopping and e-mail) scores and age and gender. Figure 4 demonstrates the relationship with age: the user's facility score decreased as age increases. This might result from a number of factors including the fact that older people might be less familiar with Internet technology like chat rooms and e-mails, have more fears about the security of online shopping and disapprove more of advertisements. In addition there was some gender bias with women being more likely than men to be happy with "facilities" (Figure 5). This relation was also repeated for system attributes. Women were also found to be happier than men with the

Figure 3 User scores on content attributes (breadth, depth and trust) over how many sites visited for health information



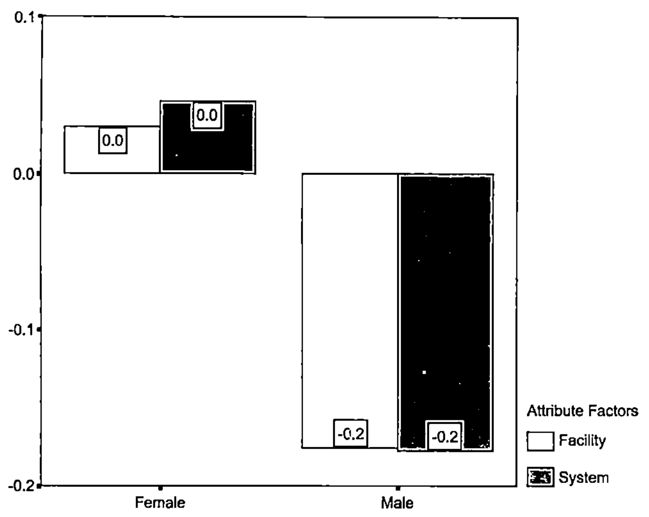
Note: Df = 4, 404 $f = 4.12$ $p = 0.003$

Figure 4 User scores on facilities (advertisements, shopping and e-mail and age)



Note: Df = 5 375 $f = 3.08$ $p = 0.01$

Figure 5 User scores on facility and system attributes and gender



Note: F2 Df = 1 $f = 3.74$ $p = 0.054$ df f3 df = 1, 398 $f = 3.19$ $p = 0.032$

system attributes – that is they tended to be more satisfied with speed of delivery and navigation ease.

A relationship was also found between system attributes and the number of visits made to SurgeryDoor (Figure 6). Those people who visited the site less frequently (just once a month) scored lower on system attributes (speed and navigation). Logic suggests that these people were irregular users because of these factors (which they did not like) or perhaps they were just unhappy with a site with which they were not familiar. Furthermore, some users may have a slow Internet connection and consequently blamed the site rather than their own computer set-up for this. Attitudes towards system site attributes were also found to be related to the user's health interest in the site (Figure 7). Carers and those users currently suffering from an illness were found to be much more positive with regard to the site's system attributes.

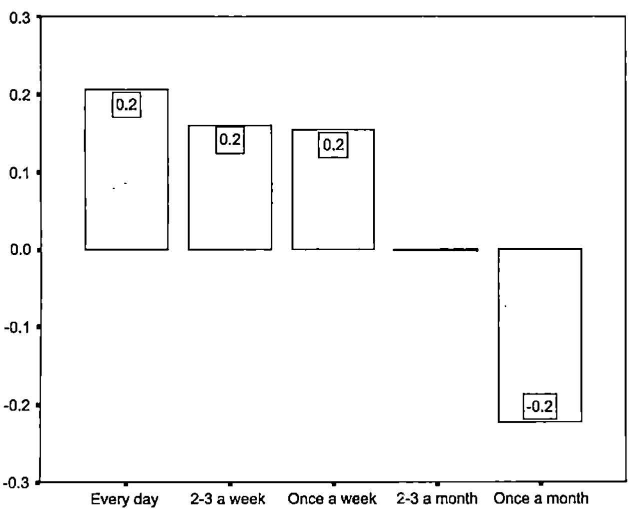
Health topics most sought

Clearly content must be one of the most important reasons for using a health Web site. But precisely in what type of content are people interested? Figure 8 provides the details and shows user preference scores for 12 health topics, such as New Treatments, Natural Health, Pregnancy etc. Users rated each as very important, important, not so important or not important. Scores again were out of 4, where a 4 indicated that the topic was very important. The two most importantly rated topics were General Health information (3.3) and Diet (3.2). Poorly performing topics included information on Medical Conditions (1.8), Pregnancy (2.2) and Support Groups (2.3). This may well reflect user interest in coming to this particular site and maybe they get the latter information elsewhere.

Categorising users according to health topics sought

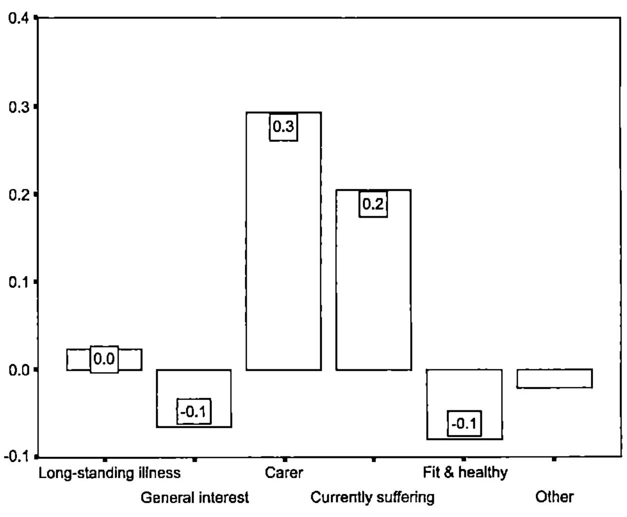
A factor analysis was conducted to identify specific user groups by topic of interest. The results are reported in Table II. Four types of "topic" user groups could be identified: "alternative remedy users", "staying fit and healthy users", "keeping up to date users",

Figure 6 System attributes (Factor 3) and number of times visited SurgeryDoor



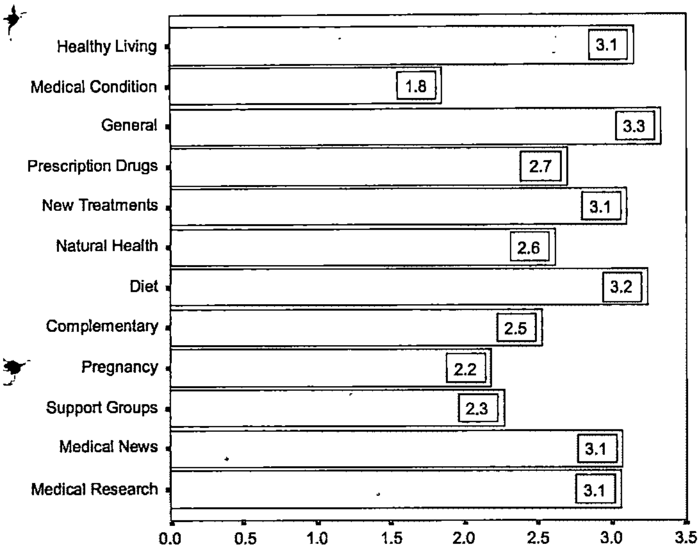
Note: Df = 4, 842 $f = 7.48$ $p = 0.000$

Figure 7 System attributes (Factor 3) and the user's health interest in the site



Note: Df = 5, 873 $f = 2.73$ $p = 0.019$

Figure 8 Interest in finding out information about the following health topics



and "ill but want to know more users". The combined factors accounted for about 60 per cent of the variance.

Alternative remedy users rated the two topics Natural Health and Complementary Medicine most highly, while the fit and healthy group rated Healthy Living, General Health and Diet topics most highly. The third user type identified rated Medical News and Medical Research highly, which suggests that these users "want to keep up to date". The fourth user type rated Prescription Drugs and New Treatments highly, which suggests a type of user who may be "ill but wants to know more" about what they have been prescribed and about new treatments.

Age, gender and for whom the person was searching were significant characteristics of the alternative remedy group. Thus, alternative remedy users tended to be women under the age of 34 (Figure 9) and tended to search on behalf of friends and children (Figure 10). Previous research by the team has shown that information passed on by a friend is a poorly trusted information source and hence was unlikely to be used (Nicholas *et al.*, 2002). However, these users were also using this information for themselves and for their dependants (Figure 10).

The fit and healthy information user group was found to relate to the user's current health status (Figure 11), and those who were currently healthy scored highly. These users, it seems, were accessing content so as to "stay" fit and healthy and to check health requirements etc. A low positive correlation (0.27) was also found between "content" attributes and this type of user, suggesting that these users were also interested in depth, quality and trust of content.

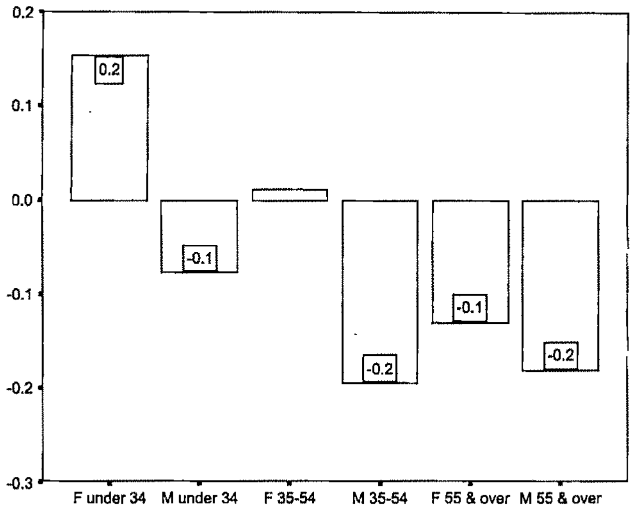
The "ill but wants to know more" type of user was found, perhaps unsurprisingly, to relate to the person's current health status (Figure 12), with carers, those currently suffering and those who had a long-term illness being more likely to feature in this group. This was also true to a certain extent of users identified as wanting to keep up to date. Those people with a long-term illness also sought to keep up to date with health information. Furthermore, those users searching for other people and for children also featured strongly in the "Ill but wants to know more" user group (Figure 13).

Table II Types of user by topic interest

	Factor 1 Alternative remedy (17% variance)	Factor 2 Staying fit and healthy (17% variance)	Factor 3 Keep up to date (16% variance)	Factor 4 Ill but want to know more (10% variance)
Healthy living		0.720		
General health		0.629		
Prescription drugs				0.721
New treatments				0.559
Natural health	0.845			
Diet		0.682		
Complementary medicine	0.814			
Medical news			0.734	
Medical research			0.861	

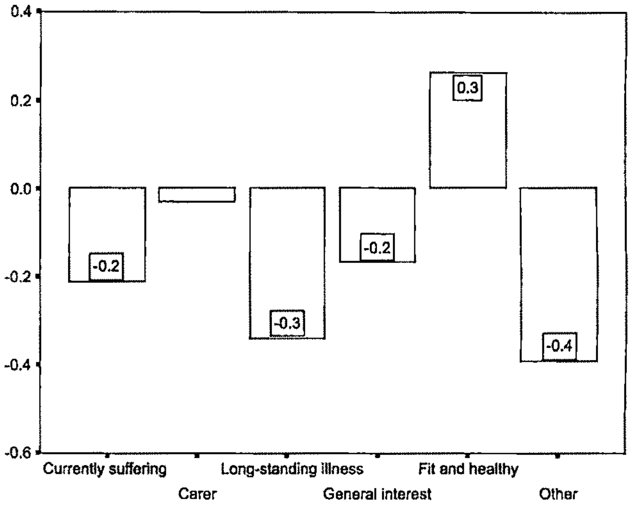
Notes: Principal axis factoring, Varimax rotation, KMO = 0.70, pregnancy, medical conditions and support groups dropped on the basis of a low communality score. Factors, given in parentheses, scores greater than 0.4 included

Figure 9 Alternative remedy user (Factor 1) and their age gender characteristics



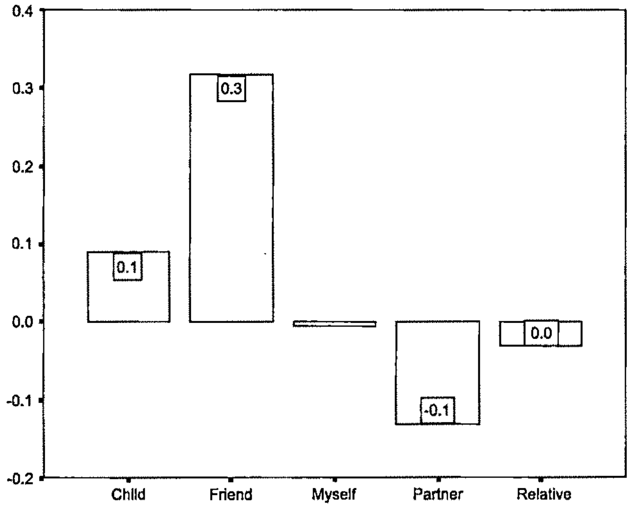
Note: Df = 5,851 $f = 3.14$ $p = 0.008$

Figure 11 Staying fit and healthy (Factor 2) and current health status



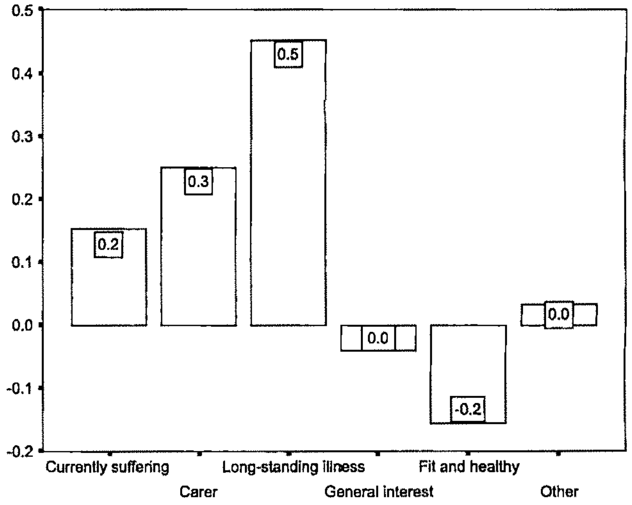
Note: Df = 5,874 $f = 16.94$ $p = 0.000$

Figure 10 Alternative remedy user (Factor 1) and for whom the user was searching



Note: Df = 4, 871 $f = 2.36$ $p = 0.052$

Figure 12 Ill but wants to know more (Factor 4) and current health status (also true for Factor 3)



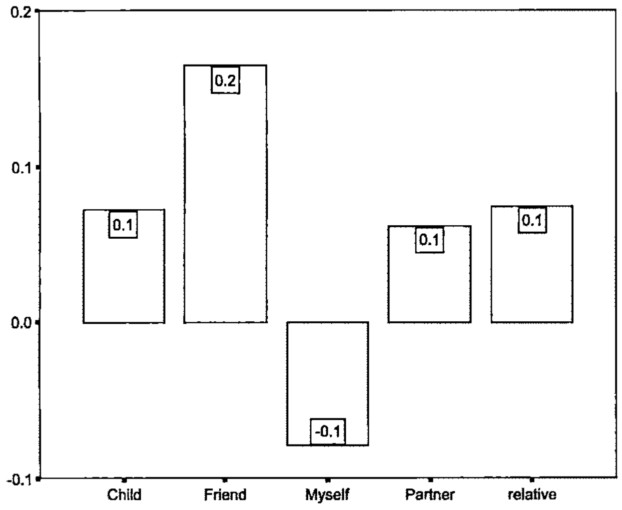
Note: Df = 5,874 $f = 11.58$ $p = 0.000$

Profiling users by the health site searched

It is evident that different user types might be attracted to different types of health sites. A one-size, all-purpose health site that fits all user types and interests of users is unlikely to exist. People may be attracted to a site for style differences as well as site attribute factors and content differences. Also, old and young users may distinguish themselves by adopting different site-visiting behaviour. At present we do not have access to comparable data for other sites. However, we can, in the context of the current study, look at user differences revealed between SurgeryDoor users who have visited different combinations of health sites. Here we will look at site attribute, topic interest and user characteristic differences between SurgeryDoor users who also use NHS Direct Online and with SurgeryDoor users who also visited Net Doctor. The aim of the analysis is to see if these differences reveal any information about the profiles of users for the various consumer health sites.

A total of 29 per cent of respondents said that they visited just one site for their health information, 71 per cent of respondents visited two or more sites and 39 per cent visited three or more different sites. Figures 14 and 15 show which site people visited first and which ones they additionally used. Not

Figure 13 Ill but wants to know more (Factor 4) and for whom the user was searching



surprisingly, perhaps, about nine out of ten users said that SurgeryDoor was their first choice. NHS Direct Online, Net Doctor (www.netdoctor.co.uk), Medic Direct and Health in Focus were also mentioned as a first choice but the percentages were insignificant, between 1 to 4 per cent. These four sites, however, were significant as second sites visited. Net Doctor and NHS Direct Online were clearly important, each attracting around a third of responses as a second site preference.

It was decided to restrict the between-site analysis to only those respondents who said that they had visited two or more sites. This was done so as to exclude from the analysis comparisons between those users just visiting one site and those visiting more than one site. In addition it was decided to exclude those respondents who said that they visited both NHS Direct Online and Net Doctor.

A logistic regression model[2] was used to determine which site attributes, topics and user characteristics would explain differences between people using different combinations of sites. All the variables reveal something about users and variables indicated by the analysis will give an idea of the likely profile/characteristics of the different user groups. Three models were considered:

(1) a comparison between those SurgeryDoor users that used the NHS Direct Online site and those that did not;
(2) a comparison between those SurgeryDoor users that used and did not use the Net Doctor site; and
(3) a comparison between NHS Direct Online and Net Doctor users.

Figure 14 First site visited

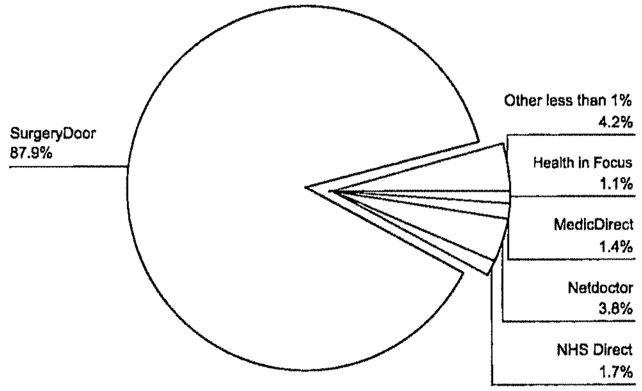
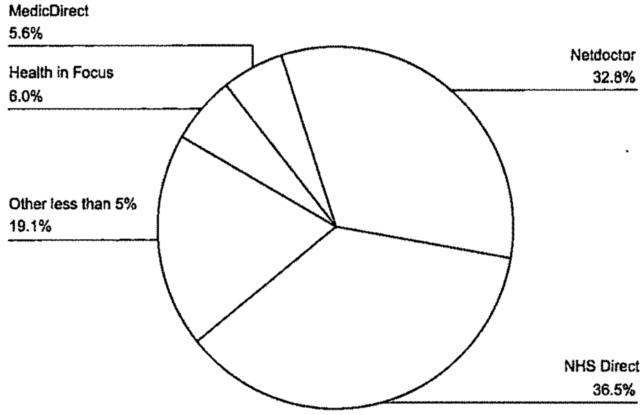


Figure 15 Second site visited



Not all users here were SurgeryDoor users; we are simply grouping and comparing users of the two most important second sites visited with those that did not use these sites. Table III lists the significant coefficients.

There is an increased tendency for Net Doctor users on the SurgeryDoor site to be younger compared with other SurgeryDoor users. Net Doctor users were just under half as likely to be aged 55 and over and were about one-third less likely to be aged between 34 and 54 compared with other SurgeryDoor users. The over-55s made up 18 per cent of total questionnaire responses, while the age group 35 to 54 made up about 50 per cent of responses. A total of 40 per cent of Net Doctor users were aged 34 and under compared with 29 per cent of other SurgeryDoor users. Age of user was also a significant difference between NHS Direct and Net Doctor users. The Net Doctor site seemed to attract a younger user type. Why should this be? This age profile might say

Table III Variables identified as explaining differences between different combinations of site use

		Compared with other SurgeryDoor users				Net Doctor compared with NHS Direct		
		Net Doctor(1)		NHS Direct(1)			NHS Direct(1)	
	N	Log odds ratio	SE	Log odds ratio	SE	*N*	Log odds ratio	SE
Family set-up								
Live alone	70							
Does not live alone	488			1.80t	0.33			
Salary (£)								
Less than 15,000	110					66		
15-22,000	137			1.03	0.30	80	0.93	0.35
23-29,000	115			1.31	0.31	71	1.05	0.36
30-44,000	119			1.76t*	0.30	85	1.08	0.36
45-59,000	45			2.21*	0.39	27	2.38t	0.50
60,000+	32			0.75	0.49	21	0.41	0.56
Age								
34 and under	197					127		
35-54	312	0.67*	0.19			184	1.66*	0.25
55+	79	0.64	0.29			39	1.52	0.39
"Staying fit and healthy" type user		0.72***	0.11	1.51**	0.12		1.7***	0.15
Navigation	132					68		
Important	284	1.35	0.23			173	0.74	0.31
Very important	172	1.91*	0.26			109	0.51*t*	0.34

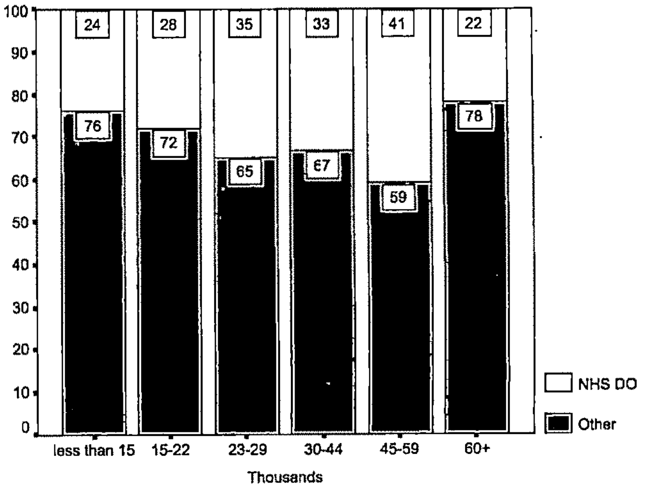
Notes: Levels of significance (Wald's Statistic): $t < 0.1$, $*p < 0.05$, $** p < 0.01$; $*** p < 0 .001$

something about how the site is presented. For example, there is a greater use of menu icons on this site compared with either SurgeryDoor or NHS Direct Online. Content is also considered an important attribute in attracting a younger user profile.

In comparing NHS Direct Online users with other users, salary was found to be an important distinguishing factor. There was an increased incidence of a person being an NHS Direct Online user as income levels increased. This relationship is shown in Figure 16. It shows that 41 per cent of those SurgeryDoor users earning between £45,000-59,000 were also NHS Direct Online users but this was only true of 24 per cent of those earning less than £15,000. NHS Direct Online seems to attract users with a wealth profile. The wealth variable here may be an indicator for other variables that relate to it, for example, the user's education and class. The NHS Direct Online site might be appealing to this type of user. Hence the NHS Direct Online may well be perceived as a more upmarket or a traditional, safe and conservative site – a broadsheet rather than a tabloid type of health site. NHS Direct Online users were also significantly more likely to rate general health and to a lesser extent medical news information as important or very important.

Family characteristics was also important, with NHS Direct Online users being less likely to be "live alone" users. This was truer in a comparison with other SurgeryDoor users than with Net Doctor users. Family characteristics may be important in that families may be more likely to have regular contact with the NHS generally and might

Figure 16 Salary of respondents (grouped) by use of NHS Direct Online site



well search specifically for NHS Direct Online because of this.

Information interest types

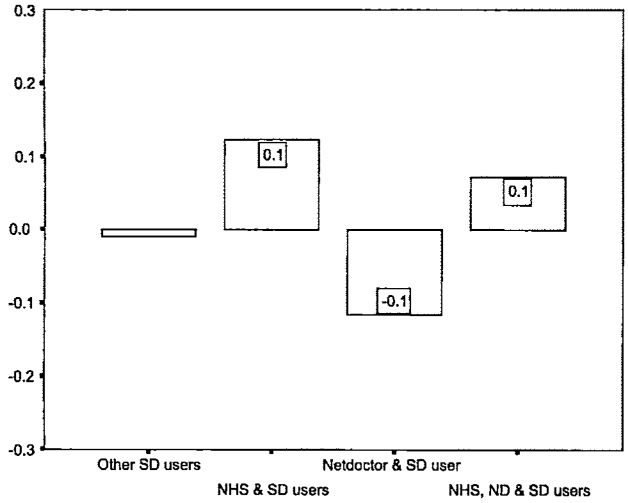
Users identified as wanting to stay fit and healthy do differentiate or discriminate between the sites. Thus the staying fit and healthy user type tended to be more likely to be also an NHS Direct Online user and less likely to be a Net Doctor user. Figure 17 describes this relationship and includes those users who had visited both sites.

Those who used SurgeryDoor, who also used NHS Direct Online, were more likely to be a "staying fit and healthy" type user, while Net Doctor users scored poorly and this type of user was not attracted to the Net Doctor site. Perhaps Net Doctor users are not so interested in staying fit and healthy but are more interested in the health limitations and implications for their life style. Again this may say something about the content difference between the two sites (Net Doctor and NHS Direct Online) and how each site markets itself.

System attributes

The user rating of navigational structure was found to be a distinguishing factor. Thus, Net Doctor users were just over twice as likely to rate the navigational attribute as being important compared with either other SurgeryDoor users or users who additionally used NHS Direct Online. NHS Direct Online users were half as likely to rate navigation as very important. This may reflect real navigational differences between the three sites. This argues that the market reaction is that the NHS Direct Online navigational structure is poor, while for Net Doctor it has been rated as good. Alternatively, this may say something about the attitude differences between NHS Direct Online users and Net Doctor users. NHS Direct Online users do not seem to rate navigational structure as important and this might imply a stronger brand attachment to NHS Direct Online. These users are not so interested in site attributes as in NHS Direct Online itself. However, for Net Doctor users navigational structure is important – these users seem to be site attribute-driven and may well represent more of a floating, less brand-loyal audience, and may well jump site to another offering a better attribute combination.

Figure 17 Staying fit and healthy (Factor 2) by site combination visited



Note: Df = 3,876 $f = 3.42$ $p = 0.017$

Conclusion

This paper has identified discrete sub-groups of health consumers and developed an understanding of the relationship between user types, user characteristics and site preferences. This type of research should be useful in informing designers of Web sites, especially with regard to menu construction. Patently, sites should now move on from broadcasting information generally to the "average" user to assisting specific groups of users to find what they are seeking. Thus, for instance, alternative medicine information seekers should be able to use the menu structure to quickly retrieve the information they need. Menus should reflect actual user interest rather than – as is too often the case – the producers' or the site designers' interest. To assist in this our study has provided user profiles for a range of consumer health sites and developed arguments around the sites' information provision and presentation. Site producers and information providers can determine interests both by surveying users (and potential users, offline, if possible) and by analysing pages accessed – log analysis.

Users were grouped according to the site characteristics favoured – content provided, facilities offered and system functions. Users were also identified by their topic of interest: "alternative remedy" user; "staying fit and healthy" user; "keep up to date" user; and "I'm ill but want to know more" user. Previous Internet health researchers have not used these groupings. The key findings about these groups were:

- With regard to user groups by site characteristics favoured, a relationship was found between the user's score regarding the importance of content (breadth, depth and trust) and the number of health sites visited. It was found that the user's content rating decreased as the number of sites visited increased, characteristic, one would have thought, of the "promiscuous" digital information consumer. Furthermore, the user's facilities (advertisements, shopping and e-mail) rating decreased as age increased. There was some gender bias with women being more likely than men to be happy with advertisements, shopping and e-mail services.
- Four types of Internet users were identified by their topic of interest: "alternative remedy" user; "staying fit and healthy" user; "keeping up to date" user; and "I'm ill but want to know more" user. Alternative remedy users tended to be women under the age of 34 and further tended to search for a friend or for a child. The "ill but wants to know more" type of user was found to relate to the user's current health status and whether they were carers or not. Not surprisingly perhaps, those currently suffering from an illness and those who had a long-term illness were more likely to feature in this group, as well as those who were looking for information on someone else's behalf and were interested in both new drugs and treatments.
- It was possible to characterise users according to the pattern of health sites visited. Net Doctor users on the SurgeryDoor site were more likely to be younger compared with either other SurgeryDoor users or NHS Direct Online line users. The staying fit and healthy type of SurgeryDoor user tended to be more likely to be also an NHS Direct Online user and less likely to be a Net Doctor user. This may say something about the content difference between the two sites (Net Doctor and NHS Direct Online) and how the site attracts users. In was found that there was an increased incidence of a user being an NHS Direct Online user as income level increased.

Notes

1 www.surgerydoor.co.uk 3W Marketing Ltd were responsible for gathering the information but not its analysis.

2 Logistic regression was used in the second part of the analysis. Logistic regression is similar in "concept" to least squares linear regression, though its procedures, assumptions and underlying statistical model are different. Logistic regression is used whenever an outcome event can be classified into two populations. It is used here with regard to the outcome if a user made use of a secondary site (NHS Direct or Net Doctor): the user either did or did not. In particular the model is used to decide which users' characteristics are predictive or significant for the outcome occurring. Logistic regression in addition estimates odds, that is it says something about the impact of each information source on the outcome. The odds are the likelihood of the outcome occurring, given the user-graded importance of each information source.

References

Boston Consulting Group (BCG) (2001), "Most European e-health ventures are failing because they rely on typical, retail e-commerce business models", available at: www.bcg.com/media_center/media_press_releases.asp (accessed 13 June 2003).

Burson-Marsteller (2000), "The e-fluentials", available at: www.efluentials.com. (accessed 13 June 2003).

Cyber Dialogue (2000), "Cybercitizen Health 2000", available at: www.cyberdialogue.com (accessed 5 January 2001).

Eysenbach, G. and Köhler, C. (2002), "How do consumers search for and appraise health information on the World Wide Web? Qualitative study using focus groups, usability tests, and in-depth interviews", *British Medical Journal*, Vol. 324, pp. 573-7.

Gann, R. (1998), "Empowering the patient and public through information technology", in Lenaghan, J. (Ed.), *Rethinking IT and Health*, Institute for Public Policy Research, London.

Health on the Net Foundation (HoNF) (1999), *5th HON Survey on the Evolution of Internet Use for Health Purposes: October-November 1999*, available at: www.hon.ch/Survey/ResultsSummary_oct_nov99.html (accessed 13 June 2003).

Huntington, P., Nicholas, D., Williams, P. and Gunter, B. (2002), "Characterising the health information consumer: an examination of the health information sources used by digital television users", *Libri*, Vol. 52 No. 1, pp. 16-27.

Impicciatore, P., Pandolfini, C., Casella, N. and Bonati, M. (1997), "Reliability of health information for the public on the World Wide Web: systematic survey of advice on managing fever in children at home", *British Medical Journal*, Vol. 314, pp. 1875-81.

Jepsen, D. and Dipnall, J. (2003), "Ethics in leadership: the Internet perspective", available at: www.mrsnz.org.nz/Files/Conf-JoD.PDF (accessed 13 June).

Leydon, G.M., Boulton, M., Moynihan, C., Jones, A., Mossman, J., Boudioni, M. and McPherson, K.

(2000), "Cancer patients' information needs and information-seeking behaviour: in-depth interview study", *British Medical Journal*, Vol. 320, April, pp. 909-13.

M2 Presswire (2000), "UK-specific health Web site aims to capture a fifth of online health market", M2 Presswire news release, (Lexis-Nexis Universe UK News database).

Modalis (2001), "Modalis market tracks Internet user – post-hype report", May, available at: www.modalis.com (accessed 13 June 2003).

Nicholas, D. Huntington, P. and Williams, P. (n.d.), "The Web, the kiosk, digital TV and the changing and evolving face of consumer health information provision: a national impact study, April 2000-January 2002", DoH.

Nicholas, D., Huntington, P. and Williams, P. (2002), "The impact of location on the use of digital information systems: case study: health information kiosks", *Journal of Documentation*, Vol. 58 No. 3, pp. 284-301.

Nicholas, D., Huntington, P. and Williams, P. (2003), "Perceptions of the authority of health information: case study: digital interactive television and the Internet", *Health information and Libraries Journal*, (in press: September 2003).

Norbert, G., Mounia, L. and Norbert, F. (1999), "A probabilistic description-oriented approach for categorizing Web documents", *Proceedings of the 8th International Conference on Information and Knowledge Management 1999*, Kansas City, MO.

Oats, S. and Gibson, R. (2003), *ECPR 2003 Workshop: The Changing Media and Civil Society*, available at: www.essex.ac.uk/ecpr/jointsessions/edinburgh/details/ws%2020.pdf (accessed 7 February).

Pew Foundation (2000), *Pew Internet and American Life Report: The Online Health Care Revolution: How the Web Helps Americans Take Better Care of Themselves*, available at: www.pewinternet.org/reports/reports.asp?Report=26& Section=Report Level2&Field=Level2ID&ID=134

Pinder, R. (1990), *The Management of Chronic Illness*, Macmillan, Basingstoke.

Poensgen, A. and Larsson, S. (2001), *Patients, Physicians, and the Internet: Myth, Reality, and Implications*, Boston Consulting Group, Boston, MA.

Information needs of people with multiple sclerosis and the implications for information provision based on a national UK survey

Mark Hepworth, Janet Harrison and Nicole James

The authors

Mark Hepworth and **Janet Harrison** are Lecturers and **Nicole James** is Research Associate, all in the Department of Information Science, Loughborough University, Loughborough, UK.

Keywords

Health education, Information, Personal needs, United Kingdom

Abstract

Qualitative and quantitative methods were used to study the information needs of people with multiple sclerosis (MS) in the UK. Categories of information need were identified; their importance and difficulty in obtaining them quantified. The research highlighted how there were significant differences in terms of people's desire for the information, the topics in which they were interested and how they wanted that information. Information provision to people with MS was found to have improved dramatically over the last seven years, but was found to be inconsistent in terms of subjects covered. However, it should be borne in mind that it may be difficult for people to take on board information for a variety of reasons. Furthermore, different individual needs mean that information provision is a complex task. Many intervening factors can make it fail. The research made it clear how access to relevant information, provided in an appropriate way, could significantly improve the quality of life of the person with MS and that there is considerable scope for improving provision of information to people with MS.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · pp. 290-303

© MCB UP Limited · ISSN 0001-253X

DOI 10.1108/00012530310498860

Introduction

This research took place between January and October 2002. It was commissioned and funded by the MS Trust. Research into the information needs and information provision for people with Multiple Sclerosis (MS) was driven by a belief, supported by previous research, that information provision was inadequate (Robinson *et al.*, 1996; Baker, 1997) – also that information and knowledge are beneficial to the wellbeing, in terms of feelings of control, depression and reduced dependence on the health service, of people with MS (Somerset *et al.*, 2003).

The aims of this study were to:

- provide systematically a comprehensive understanding of the information needs of people with MS;
- determine what information needs were most important to people with MS;
- determine what information was currently most difficult to find;
- specify what information should be made available to people with MS; and
- recommend how information should be made available to people with MS.

The results of the research were expected to help determine the information policy of the MS Trust and also provide guidance, in terms of information provision, for service providers in the health and social services as well as other voluntary organisations and public information providers. This paper focuses on the information needs that were identified, explaining the subject-matter and why this information is important, the form in which it is required and the way it should be provided.

Overview of multiple sclerosis

There are approximately 85,000 people with MS in the UK. MS affects more women than men (approximately two women for every one man) and is generally diagnosed between the ages of 20 and 40. In parts of Scotland it is estimated that one in 500 will have MS; for the rest of the UK it is approximately one in every 1,000.

In MS the myelin sheath around the nerve cells is attacked, the nerves become demyelinated and may not function as they should. MS can affect any part of the central nervous system and can potentially alter movement and muscle activity at several different sites, giving rise to a variety of physical and psychological symptoms. Although it was first identified in the 1860s, the cause(s) of MS remain in dispute and a cure is elusive.

MS is a particularly challenging disease in that it is highly unpredictable, and can result in a wide range of psychological and physical challenges that can vary from year to year and day to day – which can lead to a high degree of uncertainty and a need for information (Wilson *et al.*, 2002).

Previous research

Little specific research has previously been conducted on the information needs of people with MS. Earlier research tends to be general and does not attempt to identify comprehensively and categorise the information needs of people with MS. It has been recognised, however, that people with MS need to make long-term, information-based decisions about their condition (Wollin *et al.*, 2000).

In 1996, in the UK, Robinson *et al.* (1996) conducted a qualitative study of the needs of people with MS. Part of this study concerned information. They found that appropriate information was hard to find and use and that it was not available when and where they wished to access it. The information needs that were identified included:

- information on the condition itself;
- symptoms and managing symptoms;
- current research;
- benefits and entitlements;
- insurance and mortgage advice;
- transport for the disabled;
- suitable holiday venues;
- respite care;
- medical and complementary therapies;
- social and support groups;
- voluntary organisations;
- employment and statutory rights advice; and
- home adaptations and aids.

The report highlighted that individuals might have different information needs at any particular time due to different circumstances. The report concluded that a centralised source of information would be useful.

In 1977 Matson and Brooks in the USA studied people with MS to determine how they had adjusted to the condition since diagnosis. They concluded that most adjustment takes place in the first ten years after diagnosis. Based on their findings they proposed a four-stage model of adjustment to MS, in which information plays a role. Newly diagnosed patients entered stage 1 (denial) immediately. Here they sought information through different medical channels in an attempt to dispute the diagnosis. In stage 2 (resistance) it was shown that people acknowledged the possibility of having MS and anxiously sought information about the condition and a cure. Patients also turned to others with the same condition and participated in groups or classes to garner any information that might be helpful. Stage 3 involved telling other people about MS. Stage 4 began when a person had fully accepted the condition.

Matson and Brooks (1977) stated that information given by the consultant was seen as inadequate, perhaps because patients desired life-encompassing direction, which might be beyond the knowledge of the individual consultant. Most people with MS wanted practical information that would help them live with their condition. To find this information they used a variety of sources, with varying degrees of success.

Stewart and Sullivan (1982), in the USA, found that information-seeking activity starts in the pre-diagnosis period and continues until a diagnosis of MS is confirmed. They also found that, because symptoms could be fleeting and might vary from one exacerbation (attack) to another, people engaged in "physician shopping" until they found a doctor who could diagnose their condition. People also sought information from popular literature and medical texts, as well as from health professionals, family and friends. Matson and Brooks (1977) noted that, in the post-diagnostic period, people with MS wanted practical information to help them live with their condition and sought information from other people with MS.

Baker (1997) in the USA undertook a study of people who had recently undergone an acute exacerbation of MS. This study involved a questionnaire survey of 260 women. The results helped to identify categories of information need and contributed to the questionnaire design in the current study. Categories of information need included:

- *physiological* (general information about MS, nutritional literature, fatigue, bowel and bladder disturbances etc.);
- *psychological* (dealing with a hidden disability, emotional behaviour, spiritual material etc.);
- *social* (education, support for family members, branches for women etc.); and
- *economic* (insurance, employer relations etc.).

Baker revealed gaps in people's knowledge about physical symptoms which people with MS were experiencing, emotions they felt, and drugs that could be used. Various sources of, and barriers to, obtaining information were identified. The results also suggested that health professionals needed to be aware of the continuing need for relevant, current and specific information to help people with MS retain their independence and to enable them to make informed decisions.

Baker (1994) also found that people tended to fall into the category of either "monitors" or "blunters", that is, people "either want information to handle an uncontrollable event or turn away from it because information is perceived to increase their level of anxiety".

A New Zealand-based study by Gregory *et al.* (1996) discovered that people with MS found generic information regarding MS readily available, but that practical information at a local level was frequently difficult to obtain.

In a review of health-care preferences of people with MS in the UK, Somerset *et al.* (2001) found that three-quarters of the people surveyed reported lacking advice about at least one MS-related issue and 17 per cent lacked advice in five areas. The most frequently consulted health professional was the GP, followed by the hospital consultant. The professional that most people said they would have liked to see was an MS specialist nurse. The study concluded that people with MS displayed a wide variation in their unmet needs, and that information about MS management (both conventional and unconventional), relevant tailored advice and access to appropriately skilled professionals should be components of high quality care.

The literature does, therefore, provide some insight into the information needs of people with MS, their information-seeking behaviour and information provision. The needs can be seen to be broad and people with MS might not be successful in satisfying them. There were insufficient detailed empirical data to enable a comprehensive definition of the information needs of people with MS.

The research, discussed here, aimed to build on the previous research and to provide a more comprehensive view of the information needs of the MS population in the UK both at the time of diagnosis and thereafter.

Methodology

Qualitative and quantitative methods were used. A total of 11 focus groups involving 103 people with MS of differing severity took part. These were held in England, Wales and Scotland in MS therapy centres. People were recruited through the centres, via local MS Society support groups and newsletters of the MS Trust and the MS Society. The population was therefore self-selected. However, each focus group session recruited people from one of three groups: people who needed no walking aids (59 per cent), wheelchair users (20 per cent), and those who used a walking-stick or walker (21 per cent). This breakdown corresponds to national figures on mobility for the MS population (Compston, 1998). At the start of the sessions respondents were asked to identify significant situations during their time with MS. Three to four of the most common situations were discussed by each group. Dervin's (1999) sense-making methodology was used to structure the discussion. The information needs associated with situations were identified as well as barriers to access. This qualitative approach helped to understand the experience of people with MS and ensured that the categories of information need were grounded in the reality of the people with MS.

These data, along with the published literature and input from stakeholders and the MS Trust, were used to inform the development of a questionnaire. The questionnaire was distributed to 4,100 people with MS through the MS Trust, MS Society, therapy and respite centres, newspapers and the Internet. To aid completion by the MS community, the questionnaires used large print and tick boxes; 2,030 questionnaires (49.5 per cent) were returned. No follow-up was instigated, partly because a 49.5 per cent response rate was felt to be good and also because of the time scale of the project. Again this was not a random sample; people chose to be respondents. Of the respondents 1,509 were female, 512 were male and nine did not disclose gender (a ratio of 3:1, which compares with the national norm of 2:1). Respondents were aged between 16 and 75. The earliest diagnosis was 1937 and the most recent 2001; 553 people with MS were diagnosed within the last five years. Data gleaned from the returned questionnaires helped to quantify the demand for and value of categories of information, the difficulty in finding information and what was required generally and specifically at diagnosis. The survey also determined how information provision has varied over time.

In addition audio-diarying was used to capture data on the day-to-day experience of a person with MS. Audio-diarying was undertaken by only five people, all who had severe symptoms of MS. Each person was given a small, easy to manipulate micro-cassette recorder and tapes and was instructed to record events, situations in their daily life where they needed to know something or wanted to find out something or had a problem that they needed to resolve. Any time a situation like this occurred they were asked to record what they were trying to resolve, why and whether or not it was resolved and, if it was, how. This technique of data collection was done primarily to see what kind of data would be generated rather than as a primary survey tool. This method did prove effective in providing detailed data on the situations the respondents confronted and their thoughts at the time – and generated greater detail than that generated by the other two methods. The audio data made apparent, for example, the range of symptoms that a person with MS could experience over a short period of time and also the importance, in terms of general wellbeing and quality of life, of taking an active role in life. Owing to the small sample the audio data were given little weight in terms of the overall findings.

Findings

Qualitative data

Focus group sessions were all tape-recorded and later transcribed and then coded. A total of 132 generally problematic topics were identified by focus group respondents. Topics were categorised under the following headings:

- A lack of knowledge when dealing with new situations associated with having MS, particularly at the time of diagnosis, but also subsequent situations such as finding out about state entitlements. This topic included discussion of how information is and should be provided. For professionals who are involved with MS it is hard to remember what it is like for a person who knows nothing about the condition or how to cope with a condition like MS.
- General symptom management including finding out about symptoms and possible actions they could take that could help.
- The difficulty of communicating with family, friends and colleagues and the need for appropriate information to help.
- The problems associated with disabled access and transport and the lack of supporting information.
- The need to make contact with and talk to other people with MS for both emotional and informative support.

Discussion of these topics helped to identify information needs and also provided an insight into how information should be made accessible.

Quantitative data

The questionnaire design was informed by the data gathered from the focus group sessions, the published literature and discussion with the stakeholders and the MS Trust. The questionnaire focused on:

- information provision and information needs at diagnosis;
- determining the importance of categories of information and the difficulty in obtaining them; and
- the best format (paper, face-to-face, Internet etc.) for access and delivery.

The aggregated data for all respondents were analysed. In addition the data from people who had been diagnosed in the last five years (553 respondents) were analysed separately to see whether the picture had changed over the last five years. It was found that information needs remained consistent and that information provision was still inconsistent in terms of topics covered and at provision. However, the number of people who said they received information at diagnosis has increased dramatically over the last 20 years (in 1980 only 20 per cent of respondents received information, whereas in 2000/2001 70 per cent received information). In the last five years more information was provided on two areas: drugs and MS nurses. This reflects the introduction of disease-modifying drug therapies and the increase in the number of MS nurses.

At diagnosis over 50 per cent of the respondents wanted information on managing symptoms, drug treatments, disease course, physical symptoms, exercise, diet and information for the family. A distinction was found between the information needs at diagnosis and long-term information needs. This is discussed later. When respondents were asked whether or not they wanted to know about the different categories of information, they generally welcomed this information. However, not all people with MS wanted the same information or wanted to be informed at all. This may be because the severity of the condition can vary dramatically and people can experience very different symptoms. It may also be related to the information-seeking behaviour of the individual and intervening variables such as self-efficacy or coping strategies (Wilson, 1999) and Baker's (1994) conception of "monitors" and "blunters". These individual differences may influence how people react to situations, whether people seek information, what information they require and how it should be provided.

Discussion of information needs and implications for information provision: the need for a holistic approach

The whole community

Information provision needs to be targeted at three communities. These are people with MS, the general public (including the family, friends and colleagues), and state and voluntary service providers. As far as the authors are aware, with regard to MS, little has been done to tailor the provision of information about MS specifically to the different "communities" that are involved with MS. Each of these communities requires similar information but they require it in a different form and depth. Emphasis will also need to be placed on different types of information for different communities.

The public

The public need a basic understanding of MS. Even people who currently have no direct contact with a person with MS need to be informed about MS. Some of the problems experienced by people are due to the ignorance exhibited by the general public. For example, in the workplace, a person with MS who experiences severe fatigue in several cases was considered lazy. A lack of knowledge about MS could also influence employment practice. In the domestic situation the lack of understanding shown by the family also led to difficulty. In extreme cases this led to partners leaving due to misconceptions about MS. Again, through ignorance, some family members were concerned with whether MS was contagious.

Information needs to be made available to the general public about MS through the national and local media. This would need to relate to the information needs of the employer, colleague, friend or acquaintance. In addition, probably a more effective way in the long term would be to incorporate in secondary schooling, probably under the heading of "citizenship", information about MS. Ideally other conditions, particularly those that lead to care in the home, would be covered, since there is similar ignorance about other conditions and the help available (Hepworth *et al.*, 2000).

Information also needs to be designed that is appropriate for the family. Some headway has been made in this direction, for example, a book entitled *My Dad's Got MS* (Hetherington and Young, 2001). This approach needs to be more comprehensive, so that similar information (although with differing content) would be developed that was designed for other family members.

Access to this community information would need to be provided that was relatively simple, for example, not laden with medical terminology, clearly presented, and in a factual and positive manner (Ward and Cavanagh, 1997). This would include an overview of what MS is, the possible effects, medical support, social services support and voluntary groups. Information that helped people deal with specific situations would have to be provided separately and when appropriate. Geographical personalization, so that people are informed about local support groups and services, should be practised.

If the person with MS is helped by someone who acts as an informal carer, then the information needs of the carer are going to be significant, particularly if the condition of the person with MS is severe. The informal carers would require far more information than other members of the public. They would also have a need for different types of information over time, as the condition of the person with MS changed. Ideally, the situation of the carer as well as the person with MS would be monitored and appropriate information and support provided as necessary. This may sound ambitious from the perspective of service providers. However, the cost of enabling a person with a critical medical condition to stay at home, through information- and need-related services, is far cheaper than maintaining that person in state care. According to Walker and Dewar (2001), informal carers save the UK Government £57.4 million per year.

Service providers

Similarly, service providers would need general information about MS, the help and information that are available. The latter would help them to direct people with MS to informational and practical support. For example, a recent study of the information needs of hospital social workers, who work with adults leaving hospital, confirmed that they required overviews of medical conditions, medication and possible side-effects as well as information about legislation, policy guidelines and other relevant agencies (Harrison *et al.*, 2002). This would help them to assess the kind of support the person would need and what can be provided.

Service providers, including health- and social-care professionals and support groups, would benefit from training in the information needs of people with MS and how these might be satisfied. This would help them to understand what questions people with MS may have and hence what information was needed, when this may be required and how it should be provided. Service providers need to be aware of the variability of the condition and how the nature of MS may change over time. This implies that needs should be monitored over time and that health and social records need to be maintained, so that people do not need to instigate help from scratch when it is needed in the future. A better knowledge of the condition could also place service providers in a position to recommend services of which the person with MS may not have been aware or which they found difficult to request. For example, it took people with MS who had bladder problems a long time to find out about catheters, partly because they were embarrassed to discuss such personal problems and because information about bladder disturbances and catheters had not been found or given to them. Once they did know about these areas, and were able to take advantage of this equipment, it was easier to travel from the home. This had a big impact on their lives.

In the focus group sessions diagnosis was the most common topic discussed. Where unsatisfactory experiences were described (49 per cent of people attending the focus groups) these were associated with "a lack of support", "poor attitude" and "providing no information". However, it should be noted that being diagnosed is in itself a negative experience and is likely to colour a person's judgement of the situation. Furthermore, the majority of people who did attend focus groups had been diagnosed more than ten years before, since when the situation has improved. Nevertheless from the questionnaire it was seen that 29 per cent of those diagnosed in the last five years felt they received no information at diagnosis. This indicates that information provision by health care professionals is not always successful and could be improved. Understanding what information is likely to be needed and knowing how to provide that information are not easy, bearing in mind that there are individual differences in terms of what is relevant to a person and what they actually want and also how they want it. Health professionals involved in diagnosis would therefore probably benefit from training in the information needs of people with MS and also how to provide information at diagnosis in a supportive and sensitive fashion.

The person with MS

Someone with MS should be seen as a person, and not only as a person with MS, who is likely to want to take an active role in life. Information should be provided that helps achieve this goal. Enabling people to participate actively in life as a result of access to information, and becoming better informed and more knowledgeable, whether in the home, workplace or elsewhere, has a positive impact on their self-esteem and general wellbeing. This may seem self-evident. It is, however, easy for service and information providers to focus on the condition and information specific to that condition rather than see the person with MS in the broader light and understand the impact access to information can have. As a result they may underestimate the importance of information provision and fail to provide information that helps the person with MS really engage and participate in life. The audio tapes, for example, provided a good illustration of where an individual had become informed and had found out about adapting his car and sources of finance to do so, which meant he could take his daughter to graduation. This meant a great deal to the person with MS, including increasing his mobility, independence and, importantly in this case, being able to fulfil his parental role.

Failing to take into account that the person with MS is, like any other person, fulfilling numerous roles, such as parent, wife, wage earner etc. and is having to deal with situations associated with these leads to simplistic and inaccessible information provision. First, without an understanding of the significance of information it is hard to prioritise what information to offer. Second, organisations that do not take this on board tend to provide information that only relates to the function of the organisation rather than the wider needs of the person. Third, research has shown that information seeking tends to take place when people have to resolve specific situations and tend not to seek information on topics that do not immediately concern them (Osiobe, 1998). When browsing for information people recognise useful information. partly because it obviously relates to their current situation (Bates, 1989). The success of frequently asked questions is largely to do with this. The user does not have to wade through an A-Z of functions that they may or may not understand; in other words, they recognise the task and then the solution. A booklet called *Tips for Living with MS* (MS Trust, 2002), about how to deal with common situations experienced by people with MS, was popular, for similar reasons, among people with MS. These tips were collected from people with MS by the Department of Information Science at Loughborough University and collated, synthesised and published by the MS Trust. Therefore one way of providing information for people with MS is to identify common situations with which people have to deal, such as driving a car or dealing with an employer, and provide the necessary information. Information that enables someone to drive a car who has a physical disability would include, for example, information about mobility schemes, car adaptations, possibly the usefulness of a catheter, disability access and so on. This "package" of relevant information, related to solving a particular life problem, would be easily recognised by the person with MS, when needed, and the fact that the information was integrated would mean that the person would not have to locate and interrogate numerous sources. However, as well as providing information in a way that relates to specific situations, information also needs to be provided in a discreet way, so that people can find out about a specific topic quickly.

The information that people with MS stated they wanted at diagnosis is shown in Table I. What is evident from Table I is that, although there was a significant demand for most of these categories of information, there was a significant proportion of people who did not want that information. This highlights the complexity of information provision and raises questions, such as whether offering the information in a particular way would change the percentage of people who wanted it.

After diagnosis, drawing on both the qualitative and the quantitative findings, it was determined that the following categories of information would help to satisfy the information needs of people with MS. These categories fall under two headings:

(1) *Information about MS.*
(2) *Information that helps the person with MS interact with the world around them.*
    This distinction may seem misdirected in that it could reinforce the mistaken perception of seeing the person with MS primarily in terms of their condition rather than as a person. As mentioned earlier, it would be good design practice to provide information through life situations as well as through a "directory" of topics.

Information about MS

In general people with MS should be provided with information about:

- *MS, a general explanation.* This would include an explanation of what MS is and how the body is affected. Diagrams can be very effective at communicating this kind of information.
- *MS research trials.* This was one of the areas about which respondents found it either difficult or very difficult to find out (45.8 per cent). Owing to there not being

Table I What information would you have liked or not liked at diagnosis?

What information would you have liked or not liked?	Liked	Liked (%)	Not liked	Not liked (%)
Managing symptoms	1,334	65.7	685	33.7
Possible drug treatments	1,232	60.7	787	38.8
Indication of disease course	1,121	55.2	897	44.2
Possible physical symptoms	1,118	55.1	901	44.4
Information on exercise	1,093	53.8	926	45.6
MS specialist nurse	1,089	53.6	929	45.8
Information for family	1,072	52.8	947	46.7
Information on diet	1,017	50.1	1,002	49.4
Benefits and entitlements	995	49.0	1,024	50.4
Physiotherapy	986	48.6	1,031	50.8
Contact for group of newly diagnosed	948	46.7	1,071	52.8
Alternative therapies	939	46.3	1,080	53.2
Organisation addresses	913	45.0	1,106	54.5
Possible psychological symptoms	885	43.6	1,133	55.8
Counselling	804	39.6	1,215	59.9
Work-related information	714	35.2	1,305	64.3
Driving	637	31.4	1,380	68.0
Occupational therapy	570	28.1	1,449	71.4
Other	115	5.7	1,906	93.9

a cure for MS, at present, people with MS are keen to find out about new clinical trials, for example, the findings of the cannabis trials. People with MS were also interested in getting involved in trials but did not know how.

- *Drug treatment.* For similar reasons people wanted to know about drug treatments and whether new drugs were becoming available to people with MS and the regulations and costs associated with them; 44 per cent found this difficult or very difficult to find out.
- *Symptoms.* MS can result in many symptoms, such as loss of balance and mobility in general, sight problems, pain, severe fatigue and stress. Symptoms about which people highlighted it as being difficult to find out were balance problems, emotional changes and memory problems. People with MS can experience new symptoms. Each time this occurs they need an explanation of what is happening, how serious it is and what can be done. Support groups proved particularly popular, because people could ask others about a symptom and someone else who had experienced it would inform them. Respondents did indicate that one could not always rely on the views of other people with MS. Another route for discussing symptoms (and other topics), that the MS Trust have offered, was via electronic chat sessions where people can exchange information. An expert was also present who could give a professional view and act as a moderator.

  Treatment and management of symptoms were highlighted as a separate topic. There is a distinction between knowing what something is and how to treat or cope with it. This kind of information can be provided in a factual way. However, where coping is more relevant than treatment, through the use of drugs, physiotherapy etc., information provision would need to be broader and require thoughtful design in that it should be motivating and include coping strategies.

  Information on the full range of symptoms experienced by people with MS and their treatment or management is therefore required.
- *Prognosis.* Providing information on this area requires sensitivity. Some health professionals, in conversation, say that people do not want to know how the condition could develop either at diagnosis or at any other time. This was borne out to some extent from our findings (47 per cent did not want information). It is also an area of uncertainty due to the unpredictable nature of the disease. However, 53 per cent of the respondents who had been diagnosed within the last five years

wanted, at diagnosis, an indication of the disease's course. It is likely that this response would depend, to some extent, on the condition of the person and also on how they are dealing with the situation emotionally. Prognosis can help people to plan and take control assuming a suitable state of mind.

- *Physiotherapy*. A total of 80 per cent of all respondents thought it important or very important to know about physiotherapy. It was thought generally less difficult to find out about than other topics.
- *Complementary therapy*. A total of 68 per cent of respondents thought it was important to know about complementary medicine. This includes hyperbolic oxygen as well as other complementary approaches such as massage, acupuncture and complementary medicines. One concern expressed by respondents and the MS Trust was that there is little quality control in this area and now, through the World Wide Web, people can become aware of and use "alternative" approaches that are harmful.
- *Nutritional advice*. There is evidence that diet can have an effect on MS symptoms and that certain foods exacerbate the negative symptoms of MS. As a result (and also because drug treatments may not be effective) there was a lot of interest in diet.
- *Health and fitness*. Similarly, maintaining health and fitness is thought to be beneficial. People with MS wanted information about what exercise could help and how to take part in appropriate exercise. Aquatics, for example, is felt to be particularly appropriate, because the water provides support for the weakened body and also reduces body heat, which has an adverse effect on people with MS (National Multiple Sclerosis Society, 2003).
- *Emotional changes*. This was a topic about which people with MS found it difficult to find out. As well as suffering from depression and mood changes people with MS can also experience severe fatigue that can have a negative impact on people's state of mind. Being aware of the likely emotional changes that can take place and also ways that can help to ameliorate them is therefore important.

Information that helps the person with MS interact with the world around them

Information that helps the person with MS interact with the world around them is not directly concerned with the medical condition. This includes information about the following:

- *Service providers*. Health service, social service, benefits agency, non-government and voluntary organisations, and the services they provide. Previous research with informal carers (Hepworth *et al.*, 2000) and recent work with people with Alzheimer's disease (Pritchard, 2003) highlight the difficulties people have with dealing with the various bodies that can provide help for the person with MS. The lack of knowledge people have about state and non-government organisations means that when people have a need they find it very difficult to understand exactly what organisations do, the responsibility of different roles, such as a community nurse, and how to instigate services (including how to fill forms appropriately). Organisational charts need to be made available to help people contact the right people. In addition advice on how to complete application forms needs to be provided. Increasingly we are seeing attempts to provide more "joined-up" services. This will be helpful in that organisational boundaries will be less likely to get in the way of information provision.
- *Support groups*. These groups played a key role for many people with MS. It should be noted that some people were not keen on joining groups. This was partly because they did not want to see people in a worse condition, as this indicated what the future might bring, or they did not want to be constantly reminded of their condition. Other people found support groups extremely useful for exchanging information, learning about their condition, identifying additional support and providing emotional support. Generally the atmosphere in therapy centres, for example, was extremely supportive and helped people maintain a positive state of mind.
- *Aids and appliances*. This was a category of information that related to people who had more severe MS and had, for example, problems with mobility. Again finding out about aids and appliances and

their relative merits as well as potential sources of funding was not easy. In fact once one knows where to look there is a wealth of information on this area and Disability Living Centres, that show a wide range of aids and appliances, are found in most large towns.

- *Facilities for the disabled.* Similar to the above, this category is not specific to MS. However, severe MS does tend to be associated with problems that require access to facilities for the disabled. Finding out sufficient detail about disabled access is not easy and in the UK disabled access is poor. This situation is primarily due to ignorance about disability among the general public and presumably weak legislation enforcing good design. A conversation with people with MS about a building that was supposed to be "disabled-friendly" indicated that it was not. They thought that disabled people should be involved in the planning and design. Poorly designed buildings provide a severe barrier for people with disabling MS who want to take an active part in life. Hence information needs to be made more readily available on disabled access and facilities in public buildings. In addition, people with MS with problems with mobility also needed to find out about making their own home "accessible" and possible sources of finances to do this.
- *MS and work and the issues associated with giving up work.* Being able to work and bring in an income is, of course, of fundamental importance to most people. It was, therefore, not surprising that people with MS wanted information about work, their rights, employer obligations, dealing with their employer and also what would happen and what they could do, if they had to give up full-time employment.
- *Communicating about MS with family, friends, colleagues and the public.* As mentioned earlier, information for the family, friends, colleagues and the public is very important. It was difficult for people with MS to communicate with others about their condition. People with MS need information that they can give to such people. Material specifically designed for this purpose would therefore be useful.
- *Leisure activities including, when necessary, provision for the disabled.* Information about leisure was not the most important type of information that people wanted. A total of 31 per cent of people with MS did state that they found it difficult or very difficult to find out about appropriate leisure activities and holidays. It was important for people with MS to know what was possible, rather than assume that it would be impossible to take holidays and enjoy leisure activities, especially if disability was an issue.

These categories of information are similar to those generally recognised as being required by people with an illness (Duman, 2003). The categories listed here cover a wider range of topics and include information not directly related to the condition but are important for the person's wellbeing and ability to participate in life.

How should information be made accessible?

From the authors' experience of conducting studies of people's information needs and information-seeking behaviour it is felt that there is still considerable scope for understanding how information should be provided and what factors influence whether information is taken on board and has an impact on the consumer of the information. As can be seen from the data provided here within a community, such as people with MS, the demand for different types of information is varied, as is how people want information. Generally, with regard to people with MS in this study, a number of information characteristics were important for successful information provision.

Information should be provided:

- *In a positive manner.* People with MS stated that the majority of information they received emphasised the probable negative outcomes rather than stating what can be done. Publications that talked about how people coped with their MS, and specific conditions, were very popular. Information can be provided about a particular condition. If the information is combined with positive instruction and "tips" and reassurance about the things that can still be achieved, then the information is more likely to be absorbed and a more positive frame of mind maintained. This can help a person take a proactive and positive approach to managing their condition.

- *In a way that helps and motivates people to take action.* This is similar to the last point; however, more thought is required into what kind of information is going to enable people to take action. On the one hand, as noted above, information can be phrased in a positive way and practical instruction given that will help people cope. It may also be the case that, at different points in time and depending on the frame of mind of the individual, information should be provided in different ways. In counselling, for example, the theory behind motivational interviewing techniques (Miller and Rollnick, 2002) states that people go through a cycle of stages when they are trying to change their behaviour. These stages are contemplation, determination, action, maintenance and relapse. During these stages they are open to certain types of information: factual, positive, supportive etc. They argue that helpful information will correspond to these stages or states of mind. It is possible that similar or identifiable states of mind are associated with dealing with a condition such as MS and a greater understanding of how changes in people's state of mind affect their need for information would be beneficial.
- *That corresponds to the physical, psychological and social situation of the person with MS.* People tend to want information that relates to their specific situation. This needs to be taken into account when providing information. In other words, people need to be able to identify information that relates to their situation and receive information that is relevant or takes into account their situation. Technological approaches to doing this will be discussed later.
- *In a way that is sensitive to the desire for information and its possible impact on the individual.* As noted, not all people demand all categories of information or any at all. This has to be taken into account by the information provider and catered for accordingly rather than that one should assume, for example, one message for all. As discussed earlier, this requires the information provider to be sensitive to the needs of the individual, whether in face-to-face situations or when interaction is through a machine.
- *Using the most effective means of communication.* This will vary depending on the nature of the information and the cognitive and physical ability of the person with MS. For example, face-to-face communication was found to be more appropriate for sensitive or complex issues, such as balance problems, bowel and bladder disturbances, drug treatments, emotional problems etc. Leaflets and booklets were thought to be more appropriate for topics such as access and transport, aids and appliances, benefits and entitlements, working and MS etc. Newsletters were felt to be most appropriate for information about research in general and specific research trials. Discussion groups helped answer questions and enabled people to share experiences. Different types of information resources have different characteristics that may or may not be attractive to different users. For this reason access should be provided to different sources of information that satisfy different needs, for example, academic and professional articles, popular press, experts and other people with MS. Each of these sources has different characteristics in terms of the depth, detail and style of presentation that will be more or less appropriate depending on the information need of the person with MS and their preference for how information is presented. For example, other people with MS are valued for their insight into specific situations and their ability to provide relevant information in a way to which others can relate. Academic articles are popular with independent learners who want detailed information about research, that has gone through a peer review process, and have the ability to understand the terminology used and feel unthreatened by the academic style of presentation. People should therefore be given a choice as to what type of material they can access.
- *Using different presentation techniques to cater for individual conditions that a person with MS may experience.* Overall 60 per cent of respondents stated that MS affected their information seeking and

finding. For example, severe fatigue was cited by 47 per cent of respondents as affecting their information seeking. This was followed by mobility (45 per cent). Problems with concentration also affected access to information. The design of information provision needs to take this into account in both paper-based and electronic domains. People with high fatigue and low concentration levels are going to require information in a succinct form with emphasis on a graphical rather than textual presentation of information. Mates (1995) has shown that good design, for example, using large print and contrasting colours, makes information easier to interpret. The quality of design of information for people with MS is very varied. Different organisations provide different as well as the same information that is aimed at different audiences, such as health professionals or people with MS. Some follow good design standards, others do not. Greater cognisance of good practice by information providers is necessary. For example, notice needs to be taken of the work of the Centre for Health Information Quality (2003). The latter have developed criteria for checking the quality of public information. The Welcome to Plain English Campaign (2003), as well as the King's Fund book (Duman, 2003) on producing health information, also provide guidance. In addition Web designers need to conform with good practice. In particular, the World Wide Web Consortium's Web Accessibility Initiative should be taken into account (WAI, 2003). The NHS have also sponsored the Discern project (Discern, 2003), which provides a tool to help to evaluate Web sites. Currently, much information available via the World Wide Web is difficult to access by people with physical disabilities such as poor sight due to poor design of Web sites and their inability to be read by screen readers (Scherer and Galvin, 1996; Oppenheim and Selby, 1999). In addition, small font and a lack of contrasting colours inhibit access. Hence information provision needs to be designed, so that people can access it despite their disability and can take advantage of adaptive/"assistive" technologies. Legislation, concerning electronic access to information, will come into force in 2004 (RNIB, 2002) that should help to improve the current situation.

Further research

Further work is required into the effect of individual differences (psychological and physiological) on the desire to learn and to be informed and the use of information. Research is also needed into how technology can help to provide personalised information.

A number of technological approaches have been taken to offer personalised Web pages. Bental *et al.* (1999) summarised a number of projects in this area. At the University of Brighton the ICONOCLAST project (ICONOCLAST, 2003) investigated how appropriate style and layout of documents can be determined through interaction between the author and the system. Patient leaflets were analysed to understand effective layout. At Loughborough we are currently investigating how Extensible Mark-up Language (XML) can be used to provide personalised information delivery based on the user's situation.

XML is a sub-set of Standard Generalised Mark-up Language (SGML). XML is designed to describe data and what data are. It is not a replacement for Hypertext Mark-up Language (HTML). HTML is designed to display data and to focus on how data look using pre-defined tags. In XML the publisher defines the tags. For example, <prognosis> could be a tag that is then used to identify material about prognosis. A browser does not know how to display an XML document. Therefore there must be something in addition to the XML document that describes how the document should be displayed. This is the role of XSL. XSL consists of three parts: XSLT (a language for transforming XML documents); XPath (a language for defining parts of an XML document); and XSL Formatting Objects (a vocabulary for formatting XML documents) (W3C, 2003b).

XSL is a language that can transform XML into XHTML, filter and sort XML data, define parts of an XML document, format XML data based on the data value (like displaying negative numbers in red), can output XML data to different devices, like screen, paper or voice (W3C, 2003a).

A screen was designed that allowed the user to make choices and indicate their situation, condition and information needs. For example, they could request large font and specify that they suffered from severe fatigue and that they had recently been diagnosed. This generated XSL scripts that then worked on the XML document. For example, having selected large font, the following XSL code was generated:>

$$< xsl : varible name = 2font'' > 5$$
$$< /xsl : varible >$$

where the number five signifies large font. Other characteristics of documents such as subject-matter, level of depth, text density, relevance to stage of MS, would have to be defined and a taxonomy would need to be developed that describes documents and their content, so that appropriate content can be generated when required.

If a portion of text in the XML document was tagged <start stage="a" den="ab">, this meant that, when the XSLT code was generated that stated the person with MS was at stage "a", i.e. recently diagnosed and wanted information in brief "ab", then a positive motivational piece of brief text was displayed from the XML document. XML and XSLT therefore work in conjunction, where XSLT is the programming language that develops the logic using standard conditional statements that act on the XML document. Using this approach, one highly structured document can be presented in very different ways to the reader.

Conclusion

This paper has described the information needs of people with MS. Possible solutions were also discussed. The need for people with MS to have access to information about MS as well as to information that helps them interact with the world around them was highlighted. To improve the situation of people with MS, information and training should also be made available about MS, and the information needs of people with MS, to the general public and service providers.

The information needs of people with MS was seen to be complex because:

- the needs change over time;
- the range of topics they may or may not need to know about;
- variations in the desire for information; and
- there are differences in how information is needed due to the physical and psychological state of the person with MS.

To achieve the level of personalisation required to effectively provide information to these communities, evolving technology can be exploited as well as standard methods of information provision and exchange. Our current understanding of exactly how the state of the individual affects their need for information and what this means for the design and delivery of personalised solutions is still relatively crude and requires further investigation. For example, what is the most appropriate taxonomy to describe different types of information held in XML documents? What is the most appropriate way of communicating different types of information about MS to a person experiencing severe fatigue or lack of concentration? Can information be presented in such a way that a "blunter" becomes a "monitor"? How would it be best to package information for the public and family? How can information be packaged in such a way that people with MS can easily recognise the situations with which they are dealing with and then find all the appropriate information that will help? For many of these questions we can envisage possible answers. However, to achieve a better understanding, individual differences need to be studied in more detail; an appropriate methodology for storing information needs to be developed; and access to this information through a range of techniques needs to be enabled. Having done this, these solutions need to be evaluated in terms of their impact on the MS community and the other target communities. The lessons learned through this kind of exercise would enable the full-scale implementation of relevant and personalised information solutions to people with MS. This work would also be relevant to other information providers who want to provide similar information services on different topics.

References

Baker, L. (1994), "Monitors and blunters: patient health information seeking from a different perspective", *Bibliotheca Medica Canadiana*, Vol. 16 No. 2, pp. 60-3.

Baker, L. (1997), "Preference for physicians as information providers by women with MS: a potential cause for communication problems?", *Journal of Documentation*, Vol. 53 No. 3, pp. 251-62.

Bates, M. (1989), "The design of browsing and berry-picking techniques for the online search interface", *Online Review*, Vol. 13 No. 5, pp. 407-24.

Bental, D., Cawsey, A. and Jones, R. (1999), "Patient information systems that tailor to the individual", *Journal of Patient Education and Counselling*, Vol. 36 No. 2, pp. 171-80.

Centre for Health Information Quality (2003), available at: www.hiht.org/chiq/index.htm (accessed 22 May).

Compston, A. (1998), *McAlpine's Multiple Sclerosis*, 3rd ed., Churchill Livingstone, London.

Dervin, B. (1999), "On studying information seeking methodologically: the implications of connecting metatheory to method", *Information Processing and Management*, Vol. 35 No. 6, pp. 727-50.

Discern (2003), "Web site evaluation too", available at: www.discern.org.uk/discern__about_this_site.htm (accessed 27 May).

Duman, M. (2003), *Producing Patient Information: How to Research, Develop and Produce Effective Information Resources*, King's Fund, London.

Gregory, R., Disler, P. and Firth, S. (1996), "Caregivers of people with multiple sclerosis: a survey in New Zealand", *Rehab. Nurs.*, Vol. 21 No. 1, pp. 31-7.

Harrison, J., Hepworth, M. and Chazal, P. (2002), *NHS and Social Care Library & Information Services Interface: A Study of Social Workers' Information Needs*, Department of Information Science, Loughborough University, Loughborough.

Hepworth, M., Harrison, J. and Odhiambo, F. (2000), *Leicestershire Informal Carers Study*, Department of Information Science, Loughborough University, Loughborough.

Hetherington, G. and Young, C. (2001), *My Dad's Got MS*, MS Trust/MS Society, Letchworth.

ICONOCLAST (2003), "ICONOCLAST: integrating constraints on layout and style", available at: www.itri.bton.ac.uk/projects/iconoclast/ (accessed 24 May).

Mates, B. (1995), *Adaptive Technology for the Internet*, American Library Association, Chicago, IL.

Matson, R. and Brooks, N. (1977), "Adjusting to multiple sclerosis: an exploratory study", *Social Science and Medicine*, Vol. 11, pp. 245-50.

Miller, W. and Rollnick, S. (2002), *Motivational Interviewing: Preparing People for Change*, 2nd ed., Guilford Press, New York, NY.

MS Trust, (2002), *Tips for Living with MS: Written by and for People with MS*, MS Trust, Letchworth.

National Multiple Sclerosis Society (2003), "Library and literature", available at: *www.nationalmssociety.org/Sourcebook-Exercise.asp (accessed 19 May).

Oppenheim, C. and Selby, K. (1999), "Access to information on the WWW for blind and visually disabled people", *Aslib Proceedings: New Information Perspectives*, Vol. 51 No. 10, pp. 335-45.

Osiobe, S.A. (1998), "Information-seeking behaviour", *International Library Review*, Vol. 20 No. 3, pp. 337-46.

Pritchard, C. (2003), "The information needs of people with Alzheimer's disease", Master's thesis, Department of Information Science, Loughborough University, Loughborough.

RNIB (2002), "RNIB campaigns: the Disability Act", available at: www.rnib.org.uk/campaign/ddapam.htm (accessed 18 March 2003).

Robinson, I., Hunter, M. and Neilson, S.(1996), *A Dispatch from the Front Line: The Views of People with Multiple Aclerosis about Their Needs. A Qualitative Approach*, a report for the Multiple Sclerosis Society, Final draft, Brunel MS Research Unit, Uxbridge.

Scherer, M. and Galvin, J. (1999), *Evaluating, Selecting and Using Appropriate Assistive Technology*, Aspen Publishers, Gaithersburg, MD.

Somerset, M., Campbell, R., Sharp, D. and Peters, T. (2001), "What do people with MS want and expect from health-care services?", *Health Expectations*, Vol. 4 No. 1, pp. 29-37.

Somerset, M., Peters, T., Sharp, D. and Campbell, R. (2003), "Factors that contribute to quality of life outcomes prioritised by people with multiple sclerosis", *Quality of Life Research*, Vol. 12 No. 1/2, pp. 21-9.

Stewart, D.C. and Sullivan, T.J. (1982), "Illness behaviour and the sick role in chronic disease", *Social Science and Medicine*, Vol. 16 No. 15, pp. 1397-404.

W3C (2003a), "Introduction to XML", available at: www.w3schools.com/xml/xml_whatis.asp (accessed 23 May).

W3C (2003b), "XSL tutorial", available at: www.w3schools.com/xsl/default.asp (accessed 23 May).

WAI (2003), *Web Accessibility Initiative*, available at: www.w3.org/WAI/ (accessed 25 May).

Walker, E. and Dewar, B. (2001), "How do we facilitate carers' involvement in decision making?", *Journal of Advanced Nursing*, Vol. 34 No. 3, pp. 329-37.

Ward, H. and Cavanagh, J. (1997), "A descriptive study of the self-perceived needs of carers for dependants with a range of long-term problems", *Journal of Public Health Medicine*, Vol. 19 No. 3, pp. 281-7.

Welcome to Plain English Campaign (2003), available at: www.plainenglish.co.uk/ (accessed 26 May).

Wilson, T. (1999), "Models in information behaviour research", *Journal of Documentation*, Vol. 55 No. 3, pp. 249-70.

Wilson, T., Ford, N., Ellis, D., Foster, A. and Spink, A. (2002), "Information seeking and mediated searching. Part 2. Uncertainty and its correlates", *Journal of Information Science and Technology*, Vol. 53 No. 9, pp. 704-15.

Wollin, J., Dale, H., Spenser, N. and Walsh, A. (2000), "What people with newly diagnosed MS (and their families and friends) need to know", *International Journal of MS Care*, Vol. 2 No. 3, p. 4, available at: www.mscare.com/ (accessed 22 April 2003).

Health information on the Internet: a qualitative study of NHS Direct Online users

Peter Williams
Paul Huntington and
David Nicholas

The authors

Peter Williams and **Paul Huntington** are Research Fellows and **David Nicholas** is Head of Department, all at the Centre for Information Behaviour and the Evaluation of Research (CIBER), Department of Information Science, City University, London, UK.
E-mail: www.soi.city.ac.uk/organisation/is/research/ciber/

Keywords

Internet, Health education, National Health Service, Quality, Surveys

Abstract

Examines the way the general public exploits the Internet for health information, the motives behind usage, attitudes towards issues such as quality concerns, and the extent to which Internet interventions affect the doctor-patient relationship. Although a questionnaire survey was used (posted on the NHS Direct Web site), the questions asked were open, and invited free-text "qualitative" answers. This method was a success in terms of the amount and richness of the data accrued. Results suggested that the Internet is exploited in a wide variety of ways, by users acting in a number of roles – patient, intermediary or professional. Some health professionals are now so comfortable with the Internet that they encourage Internet usage by their patients. Lay users demonstrated a high level of understanding of issues raised, and showed a (healthy?) scepticism regarding the information provided. Many users felt that their consultations with doctors had been enriched by Internet-acquired information.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · pp. 304-312
© MCB UP Limited
ISSN 0001-253X
DOI 10.1108/00012530310498879

Introduction

Health information has permeated the Internet. Electronic health information is becoming ubiquitous. Quite apart from the Government's NHS Direct presence on the Internet there exist thousands of health Web sites of commercial, voluntary and individual origin. Medical support/discussion newsgroups have also flourished. For those without Web access touch-screen kiosks can be found in health centres, supermarkets and libraries, and the Internet itself is now accessible on touch-screen systems and digital television. Despite the huge economic and political investment in digital health information-provision there has been little evaluation of the investment in terms of its impact on the health consumer. The CIBER group at City University are working on a major Department of Health (DoH)-funded research project, "Digital Health" (Nicholas *et al.*, n.d.), on the use and impact of the remote health information initiatives mentioned above. This paper reports on one study within this research programme: a qualitative examination of use of the Internet by the general public, using the somewhat novel method of an online survey that attempted to capture qualitative data from a small number of open questions. Much attention is afforded to the methodology, given its comparatively unusual nature.

Aims and objectives

The main aim of the research was to enrich data accrued from both computer transaction log analysis (see, for example, Nicholas *et al.*, 2002a) and questionnaire surveys employing principally closed questions (Nicholas *et al.*, 2001a, b, 2002a, b) measuring the use and impact of the Internet on the general public. The study was interested principally in the extent to which, and in what ways, the Internet was being employed with regard to people's health. The objectives of the study were to examine:

- reasons behind people's decisions both to look for health information and to consult the Internet for this purpose, and what drew people to the NHS Direct site in particular;
- how they use the Internet with regard to health (i.e. the number and type of

Internet sites accessed, and for what kind of health information);
- possible impacts on dealings with the doctor as a result of finding and using information acquired from the Internet;
- their perceptions of information in terms of quality, authority and trustworthiness.

Methodology

An open-questioned survey method was employed for this study, posted on to the NHS Direct Web site. It was hoped that the more qualitative data accruing from open questions would, as Silverman (1999, p. 8) states in his review of qualitative research, "provide a 'deeper' understanding of social phenomena than would be obtained by purely quantitative data". Often a qualitative methodology is used when little is known of the phenomenon under scrutiny (Glasser and Strauss, 1967). In the current case, however, the territory is not entirely virgin, as we have a good idea of the "information landscape" by virtue of log statistics and survey-data (Nicholas *et al.*, 2001a, 2002b). However, qualitative research addresses not only relatively narrow questions about the use of and opinions about the particular system or service, but with the full context in which an information need arises and is met. Moore (2000, p. 121, original emphasis) claims that "quantitative data are very good at telling you what is happening, qualitative provide an insight into the deeper question of *why*?"

Previous research by the group, particularly work on the use and impact of the Internet (e.g. Nicholas, 1996; Nicholas *et al.*, 1999), has confirmed assertions (Dervin 1992; Wilson, 1990) that often the perspectives of information professionals and researchers are not those of the user community. It is vital, therefore, that in researching the needs of those for whom the service – be it an information kiosk, Web site or digital TV initiative – is targeted must be free to describe their situations, needs and experiences, "in terms of their own frames of reference … on their own terms" (May, 1997, p. 112). The present research employed a loose, semi-structured questionnaire format. This approach allowed people "to answer more on their own terms", but still enabled the researcher to work with a topic framework.

An important issue, with regard to the methodology, is that of the quality of responses. Work has been done on this. Kiesler and Sproull (1986) compared response patterns with a paper questionnaire and an electronic questionnaire. They found that respondents who answered the e-survey made fewer mistakes and gave richer answers to open-ended questions.

Research has also shown that online questioning results in fewer items being omitted by respondents (Kiesler and Sproull, 1986; Schaefer and Dillman, 1998; Sproull, 1986). The biggest difference between online and offline methods, however, is that electronic surveys produce richer responses to open-ended questions (Mehta and Sivadas, 1995; Bachman *et al.*, 1996; Schaefer and Dillman, 1998). Responses to open-ended questions in online surveys tend to be longer and more revealing than those generated in standard postal, self-completion surveys (Taylor, 2000).

Finally, online research may also be effective in addressing sensitive issues. Respondents seem to be more willing to reveal information about their experiences with sensitive conditions (e.g. anxiety disorders, ovarian cancer, incontinence, erectile dysfunction) in online surveys than face-to-face. Moon (1998) found that consumers revealed a great deal of personal information when completing a computer-mediated survey. Illingworth (2001) asserts from her research on the Internet that the familiarity developed "is, at times, difficult to relinquish". The questionnaire for the present study did not seek to obtain specifically intimate or sensitive information about respondents' health information needs, although, of course, openness and honesty were desired, and a certain level of intimacy, if necessary, with regard to topics researched.

The questionnaire was posted on to the NHS Direct site for three weeks in November 2002. It began with an introductory and explanatory paragraph, which explained the research and indicated that respondents could interpret "health" in as wide or narrow a way as they wished. Seven "open" questions followed, which addressed the objectives outlined earlier (i.e. "Why do you turn to the Internet for health information?"). Subjects' age range, gender and occupation were also requested. Questionnaire responses were received by e-mail, via a "mailto" link. In many cases (24 of 42) subjects were asked follow-up questions to clarify or expand on initial answers. Only seven people, however, entered into this dialogue, presumably feeling that they had said all they wished to say on the subject.

E-mail texts were "framework"-analysed (Richie and Spencer, 1994). This approach involves a systematic process of filtering and sorting material into themes, and has been used often in health/medical research (e.g. Buckland and Gorin, 2001; Leydon *et al.*, 2000). As the questionnaire had already pre-determined seven main themes that interested the researcher, the process was relatively easy, although, of course, some respondents strayed from the question theme or did not address it.

Two researchers independently coded and sorted the data and compared their resulting "frameworks". There was little disagreement. Indeed, the only discrepancy was with regard to the issue of displacement of sources. Reports of visiting doctors less often were described as a displacement of source by one coder and as an impact on dealings with the doctor by another. It was agreed that the coding depended on the definition of displacement, and that the researchers would honour respondents in that those who discussed this in response to the section on displacement would be cited in that section, whilst views of those who saw it in terms of dealings with the doctor would be discussed there, with appropriate cross-references.

Sample

Unlike postal or face-to-face questionnaires, respondents are not targeted with an online questionnaire posting, beyond the fact that they will be users of the particular site chosen. A total of 42 people responded to the questionnaire. This was not considered sufficient to generalise answers in terms of age, gender or occupation, although it did generate over 50 pages of qualitative word-processed data. For the record there were 25 male and 17 female respondents, the modal age groups being 30-39 (female) and 40-49 (male). Most respondents declined to reveal their profession. Those who did included four health professionals, an information professional, and two journalists.

Results

Reasons for using the Internet

A great number of reasons were given for turning to the Internet for health information. Respondents answered in terms of:

- the advantages of the Internet over other sources of information;
- the role of the Internet in their information seeking; and
- the topics they researched.

The most popular advantage of the Internet was its perceived convenience: "It's open 24/7 and right in my own home. I don't even need an appointment. No waiting!" Part of this convenience was the use of health information to circumvent the need to visit a GP: "people may feel less inclined to visit the doctor, if they have access to accurate health info [*sic*] from home". Although this purpose was only specifically mentioned by three respondents, others referred to this in answer to a later question looking at the effect of information on respondents' dealings with their doctors.

"Convenience" seemed to be interchangeable with "anonymity" for some respondents, in the sense that anonymity is, itself, one of the conveniences: "It is extremely convenient to use my own PC in the privacy of my home." and "A readily available (24/7 at home) and anonymous source of information." Apart from the linkage of the home with privacy, those who mentioned anything concerned with anonymity or confidentiality did so in somewhat general terms (such as simply stating that one could look up information privately). One person confirmed that this was for information about which he felt "unable to ask doctors".

Surprisingly, only three respondents (in a sample that included health and information professionals, journalists and company directors) mentioned currency as a possible attraction of the Internet.

Perhaps, also surprisingly, the depth and breadth of information on the Internet were only cited in the first instance by two people. It may be that, these days, this aspect of the Internet is so well-known that it was not considered worth mentioning. However, those prompted for more details on answers such as "the Net is a good source of information" did make reference to the quantity in follow-up messages.

The roles of people using the Internet for health included those of being professional (nurses, journalists etc.), intermediaries (i.e. to research information on behalf of another) and patients. Some respondents used the Internet in more than one of these roles, indicating usage both when ill (i.e. as patients) and in good health, out of general interest. Using the Internet in terms of information seeking naturally depended on the role and context of the seeker. The following uses were elicited:

- professional reasons;
- self-care, including self-diagnosis;
- to complement information from a medical professional;
- intermediary usage;
- peer support (i.e. patient-to-patient); and
- general interest browsing.

Professional reasons

The four health professionals all seemed to use the Internet for a large amount of information. One said she used the Internet "to look at government documents, national guidelines, policy documents etc. Also to keep in touch with professional nursing organisations." Similarly, "I used the Net for searching my local GPs, dentists, hospitals; I also ... use specialist Web sites for anatomical images, notes on ECG interpretations, some specific medical conditions, medical procedures, prescription-only drugs ... " Perhaps, unsurprisingly, the health librarian respondent uses the Internet extensively for professional purposes: "I ... use information which is useful and relevant to students and staff at the School of Nursing and Midwifery, e.g. free e-journals, academic sites, DoH, NMAP, NMC, etc. ..."

One development seems to be the signposting by health professionals to their patients of Internet resources, despite the claim in a recent *British Medical Journal* editorial that some doctors have gone so far as to warn their patients, "Whatever you do, don't go on the Internet" (Ferguson, 2002). In one case this encouragement was for them to "use, in particular, NHS Direct", for self-care and other information. Another respondent directs patients to online support groups or official sites for various conditions. In a follow-up e-mail she added that "often, people who use the Net for information would not bother to go anywhere else, and it makes our job easier if patients have some knowledge". This represents an interesting development following the well publicised phenomenon of patients using the Internet to challenge or complement information provided by the GP (see, for example, Rumbelow, 1999). Of course, the particular sample here were Internet-using respondents, so there might be a natural propensity amongst them to champion the system.

Self-care

Self-care was another reason for turning to the Internet, including researching symptoms and self-diagnosis. This is encouraging, as the Government hopes that information provision will reduce the number of unnecessary visits to the doctor and therefore alleviate the burden on the NHS (Wanless, 2002). Eight of the respondents mentioned looking for information on symptoms, but only four of these said this was to avoid visiting a GP or medical location:

> I recently found I had shingles and obtained advice on self-help – not needing to visit my GP, as appointments often take several days to arrange. It saves the time of the GP and it is easier to ask questions of a PC than a busy doctor!

A health psychology student considered that:

> ... many people do frequently visit their GP for minor probs such as colds, when in reality there isn't a lot they can do to help. In these cases I suppose that people may feel less inclined to visit the doctor if they have access to accurate health info from home.

Another respondent mentioned using self-diagnosis flowcharts, as can be found on the NHS Direct site, who used sites "that will allow me to input symptoms [which] then give a list of 'possible' causes".

To complement information from a medical professional

In addition to self-help, respondents also mentioned using the Internet as a complementary information service to that of the medical professionals. A wide range of views was forthcoming; some may be considered as neutral, others either positive or negative. The "neutral" comments are exemplified by a housewife, who said that the Internet helps her:

> ... understand treatment options and find out where to get further information and help (and) to carry out research to enable me to get the best out of an appointment with a doctor. Before an operation or other medical procedure: to

> understand what is going to happen, and how to prepare for it.

Others made the point that the GP could not give as much information as was available elsewhere or that there were time constraints on the doctor that precluded a comprehensive information exchange. One registered disabled respondent felt that by using the Internet she saved the doctor's time: "appointments are shorter, as I am not spending long periods of time asking for information". Another said that she had "even printed out material to ask my doctor about. And it's given me questions to ask that I would not have thought of before." The issue of how the Internet is helping people in their dealings with medical professionals is discussed later in this paper.

Intermediary usage

Using the Internet in the capacity of intermediary – that is, researching things for other people – was mentioned by several (eight, or nearly 20 per cent) respondents. This is a large percentage when one considers responses were "open" – there was no prompting or options from which to choose. A good example comes from a (female) company director, who cited no fewer than four members of her family, of whom one suffered from cancer, another was an alcoholic, a third required inoculation and other travel advice, and the fourth had bouts akin to epilepsy, which the Internet helped show the respondent was a misdiagnosis. At the end of her e-mail she says, perhaps understating the case: " ... so I think I can say I have a lot of uses and found lots of help/ information".

Peer support

Peer support (i.e. patient-to-patient), often touted as a great advantage of the Internet, was cited by only three of the 42 respondents (5 per cent). One mentioned the "ability to get in touch with other patients", and another "chatting with other people with the same condition". In a follow-up e-mail the latter mentioned specifically Addison's Disease Self-Help Group. The third respondent was the lady with *polycythaemia rubra vera*. She wrote of an e-mail group for sufferers[1] "which I also found very useful on practical advice, e.g. self-help treatments for symptom relief, recommended hospitals, latest research".

General interest browsing

Only five (12 per cent) described activities that could be coded as "general interest", and even one of these – a journalist – used the Net in this way for professional reasons, to research for possible stories. Other "browsers" looked for information on "general healthy living", "lifestyle", or "information on any random thing I come across, be it news reports, or, well, wherever!" The apparent lack of interest shown in serendipity by the majority of respondents has not been reflected in other findings by the authors. A questionnaire on the site of SurgeryDoor (Nicholas *et al.*, 2001a, b) found that 45 per cent of the 1,068 respondents sought advice about keeping fit and healthy, and another 20 per cent just came out of pure curiosity. Of course, qualitative research identifies the various qualities of an activity, and does not concern itself with the quantities involved.

Topics sought

A number of respondents named specific topics in which they were interested, which they used the Internet to research. There was no apparent pattern to these. Several people mentioned only one topic: "Alternative medicine". One respondent "would like to know what works and what doesn't but [it is] hard to find impartial advice". Four other respondents mentioned the phrase "alternative medicine" and three others the word "homœopathic", making a total of eight respondents, or nearly 20 per cent.

A minority of people (five, or 8 per cent) said they use the Internet as a kind of directory or reference guide – to find, for example, medical location addresses, opening times, etc. One wrote, "Today my daughter wanted to find a dentist that provided NHS treatment in our area before she travels." Some went further than this, using the Net to "establish the guidelines and parameters of NHS treatment", or to "find out more about the consultant". A female accountant said she:

> ... was looking at the NHS Direct Web site, as I want to be treated at Guy's and St Thomas's, which is where *polycythaemia* research is done in the UK. I am unsure if the NHS allows me to specify which hospital I want and thought this Web site would tell me.

The Internet in dealing with the doctor

Clearly, many of the uses cited above (seeking information in addition to that provided by doctors, attempting self-diagnosis, and exchanging peer support) may have an effect on one's dealings with medical professionals. The questionnaire sought views on the extent to which there has been any such impact. There was some indication that the Internet had enhanced the doctor-patient encounter:

> I visit the surgery less often, often discuss the alternatives with the GP, and, on occasion, arrive at an agreement with the GP that I will try [an] alternative remedy first rather than taking an allopathic drug. Sometimes the condition disappears with the alternative approach and there is no need to see the GP again.

Another said:

> My GP has been positive about my use of the Internet. He freely admits my condition is very rare and he has never treated it and he has appeared interested in the information I have.

These are interesting comments, in that they reflect the Government's vision for the future, as expressed in the Wanless report, where the aspiration is that patients will work in partnership with medical professionals.

There were many comments, on the other hand, which suggested that the Internet was used as a counter-balance to information (or lack of it) provided by the GP, and that there was some hostility or disapproval on the part of the doctors.

The most dramatic account was that from a 38-year-old accountant who has a condition named *polycythaemia*, who said she had: lost confidence in the hospital, as my diagnosis and treatment have differed on many counts from what appear to be the standard procedures" and "if the Internet had not been available to me, the consultant would have made life threatening omissions [*sic*] in my case".

Quality and authority of information

A major issue when considering information found on the Internet is, of course, that of information quality and accuracy. Respondents were asked: "How do you look at the issue of 'information quality' regarding material you find on the Internet? Does it make any difference to you from where you get the information?" Of course, it needs to be stressed that the very act of asking people about quality may possibly itself prompt them into thinking about an issue about which they may not hitherto have been overly concerned. For example, only one of 20 users evaluating an Internet health information Web site mentioned quality or authenticity issues (Williams *et al.*, 2002). The responses on this occasion, albeit prompted, show a very real concern for the issue. One user said, "quality and quantity of information are paramount". Another stated:

> Information quality is obviously important especially in relation to health information; it could be potentially damaging physiologically and psychologically to receive incorrect information regarding specific conditions or symptoms.

Unsurprisingly, the medical professionals who answered the questionnaire had a good deal to say on this subject. One of the nurses said:

> Quality is so important and sometimes one gets the impression that the search for "innovation" is prized by the DH above everything else. Some nursing sites can be misleading when innovations are mentioned, but are not evaluated, so who knows if they're any good?

This is interesting, as it suggests that not even so-called "authoritative" sites are always correct. This is evidenced in the literature too. Coulter *et al.* (1999), for example, point out that even "official" information published by the NHS and other government bodies can be of dubious quality.

The free-lance health writer takes a different stance. She said:

> I try to choose sites that are recommended by people I trust, whether they be professionals or friends. ... if someone doesn't share my philosophy or just gives me a bad feeling, I don't really listen. It definitely matters who gives the information.

In other words, this user is imbuing "trusted others" with the authority – rather than the site producers. Amongst those in the health field, however, this view was an exception. More common was this, offered by a "health professional":

> I always look for health info from Web sites set up by known professional bodies or medical schools or colleges, or from NHS and government Web sites where info was provided by registered health-care professionals.

The "general public" also showed a great concern over the issue of quality and authority (although, as mentioned above, the extent to which this was as a result of prompting is not clear). A retired 71-year-old summed up what appeared to be a general feeling amongst this group: "obviously I would tend toward a reputable organisation to provide … information". Others wrote: "I think it's important to access sites of reputable organisations. Some health sites can be out of date, biased or misleading"; and "I would only rely on information from an accountable and authoritative source such as the NHS, company Web sites, professional or academic institutions". In total, 12 of 33 replies (36 per cent) to this question indicated a preference for accessing information from "official", "reputable" or "well-known" sites. One person cautioned, however, that "any information that you are unsure about should be checked with your GP/Dr and should not be the basis for important decisions".

Of course, perceptions of quality and authority often depend on the viewpoint and beliefs of the information seeker (Nicholas, 2000). Of interest to the present writers are people who take or approve of so-called "alternative" medicine, as they may regard the NHS as not being an authoritative voice when it comes to this kind of treatment. Typical of this group was the lady who said:

> Mostly I go to the Net to find alternative medicine approaches to dealing with issues of health care, especially homeopathic remedies, ayurvedic practices and natural or herbal remedies. I also practise yoga, so I will often check out those sites for possible solutions to problems.

In a questionnaire survey posted on the SurgeryDoor Web site (Nicholas *et al.*, 2001a, b) we found alternative medicine users were more likely to use information found on the Net to replace a visit to the doctor, perhaps indicating a disenchantment with orthodox remedies and perhaps even with the NHS itself. Indeed, work undertaken in evaluating health initiatives on digital interactive TV indicated that those interested in alternative medicine were less likely to trust the NHS than other groups (Nicholas *et al.*, 2003).

There was some indicative evidence of this phenomenon, although it was not a prevalent theme, as, of course, the recruitees by definition all used the NHS site. Nevertheless, one respondent claimed, "I guess I never just trust what the NHS says", having offered her view that:

> Western medicine in general is myopic in its approach to the matter of health … there is too much of the notion that current medical practices can "heal" you and too little on the concept of responsibility for one's own state of health … What the NHS offers is just one part of the whole. … I always research their diagnosis as well as their proposed remedy before using it.

Tactics for validating information included checking the organisation responsible, in one case to see if it is "transparent and not hiding anything about their credentials or the sources of the info they provide", and in another to see "whether it is a recognisable source". Of course, for those interested in alternative remedies, particular kinds of orthodox treatments, or in specific conditions these "recognisable sources" will be different. Further work is required to delve into this topic at a deeper level. Regarding the present sample, one person said he asked himself:

> Is it complete, factual, provable, first-hand and truthful? Is it up to date, current and from a reliable source? … Should I equate the infomation [*sic*] gleaned in UseNet with that obtained from NHS Direct? No, but with some understanding of those sources a judgement can be made and inferences drawn.

There was an indication from some that Internet-hosted information was unregulated and emanated from a vast number of different sources: "all information on the Net is uncensored and could have been tampered with".

Trust was an issue that came out in the replies to questions on authority and quality and, in one case, in reply to a question on sites visited. Six respondents (14 per cent) gave answers that were coded as being related to "trust". These people were generally supportive of the NHS. One respondent, a 35-year-old housewife, said:

> In terms of published information, I have a positive view of the NHS (i.e. I trust the information they publish). In other areas, such as trusting my health or that of my family to the NHS, I have a balanced view based on realistic expectations and personal experience (both good and bad).

Others mentioned trusting the NHS "to a large extent" or "on the whole", but "also look elsewhere for the information". This echoes a constant theme of Internet usage – that people now will look at several Internet sites (and, therefore, consult several organisations) for information. This appears to be true even when people "trust" one site, or when they go to predefined site types, such as "academic" etc. The ease of information access seems to have made Internet users connoisseurs.

Another issue was raised regarding trust. One respondent considered that the information was:

> ... trustworthy in the sense that the info present will be accurate on the whole

but went on to say:

> but biased in the sense that there is an economic consideration with health-care provision and the NHS is representing the DoH policies and may not promote treatments that are not available widely on the NHS.

Conclusions

This paper has reported on a study which, unusually, attempted to capture qualitative data from a questionnaire, which, accordingly, used only open questions. A total of 42 people responded to the survey, providing over 50 pages of observations, opinions, and rich accounts of practices and the motivations behind them. Respondents were forthright and open, reflecting findings from previous studies, which found that online communication yielded substantial and high quality data. Only a disinclination to engage in more than one communication exchange disappointed the researchers. It may be that too much information was sought in the initial questionnaire, and hence respondents felt they had little more to offer. Social science researchers have indicated the long time required to gradually establish rapport and trust with research subjects.

With regard to the survey results, the survey showed that the Internet is exploited, in a wide variety of ways, by information seekers acting in a number of roles. Often the same individual uses the system in different capacities – as a patient, an intermediary or a professional.

Indicative evidence is offered that some health professionals are now embracing the Internet to the extent that they direct patients to appropriate Web sites such as those of support organisations and the NHS. Lay users showed a high level of understanding of issues such as quality and authority. In some cases this manifested itself in an interesting (and healthy?) scepticism towards the NHS and its information agenda.

Overall, the survey was a success in terms of its methodology and in the amount and richness of the data accrued. As always with qualitative research, more questions are posed from the results than are answered. Follow-up work will explore further issues such as authority (and "trusted others") and the complex relationship between patient, information and medical professional.

Note

1 http://members.aol.com/mpdsupport/index.html

References

Bachman, D., Elfrink, J. and Vazzana, G. (1996), "Tracking the progress of e-mail versus snail-mail", *Marketing Research*, Vol. 8 No. 2, pp. 31-5.

Buckland, S. and Gorin, S. (2001), *Involving Consumers? An Exploration of Consumer Involvement in NHS Research & Development Managed by Department of Health Regional Offices*, available at: www.conres.co.uk/pdf/sb_involving_consumers_Jan2001.pdf (accessed 2 July 2002).

Coulter, A., Entwistle, V. and Gilbert, D. (1999), *Informing Patients: An Assessment of the Quality of Patient Information Materials*, The King's Fund, London.

Dervin, B. (1992), "From the mind's eye of the user: the sense-making qualitative-quantitative methodology", in Glazier, J.D. and Powell, R.R. (Eds), *Qualitative Research in Information Management*, Libraries Unlimited, Englewood, CO, pp. 61-84.

Ferguson, T. (2002), Editorial, "From patients to end users", *British Medical Journal*, Vol. 324, pp. 555-6.

Glasser, B. and Strauss, A. (1967), *The Discovery of Grounded Theory*, Aldine Press, Chicago, IL.

Illingworth, N. (2001), "The Internet matters: exploring the use of the Internet as a research tool", *Sociological Research Online*, Vol. 6 No. 2, available at: www.socresonline.org.uk/6/2/illingworth.html

Kiesler, S. and Sproull, L. (1986), "Response effects in the electronic survey", *Public Opinion Quarterly*, Vol. 50 No. 3, pp. 402-13.

Leydon, G., Boulton, M., Moynihan, C., Jones, A., Mossman, J., Boudioni, M. and McPherson, K. (2000), "Cancer patients' information needs and information-seeking behaviour: in-depth interview study", *British Medical Journal*, Vol. 320, p. 913.

May, T. (1997), *Social Research: Issues, Methods, Progress*, OUP, Buckingham.

Mehta, R. and Sivadas, E. (1995), "Comparing response rates and response content in mail versus electronic mail surveys", *Journal of the Market Research Society*, Vol. 37 No. 4, pp. 429-39.

Moon, Y. (1998), "Impression management in computer-based interviews: the effects of input modality, output modality and distance", *Public Opinion Quarterly*, Vol. 62 No. 4, pp. 610-22.

Moore, N. (2000), *How to Do Research*, 3rd ed., Library Association, London.

Nicholas, D. (1996), "Information systems versus information users", *Managing Information*, Vol. 3 No. 6, pp. 26-33.

Nicholas, D. (2000), *Assessing Information Needs: Tools, Techniques and Concepts for the Information Age*, 2nd ed., Aslib, London.

Nicholas, D., Huntington, P. and Williams, P. (n.d.), "The Web, the kiosk, digital TV and the changing and evolving face of consumer health information provision: a national impact study", April 2000-May 2000", DoH.

Nicholas, D., Huntington, P. and Williams, P. (2001a), "Searching intention and information outcome: a case study of digital health information", *Libri*, Vol. 51 No. 3, pp. 157-66.

Nicholas, D., Huntington, P. and Williams, P. (2002a), "Evaluating metrics for comparing the use of Web sites: case study: two consumer health Web sites", *Journal of Information Science*, Vol. 28 No. 1, pp. 63-75.

Nicholas, D., Huntington, P., Williams, P. and Blackburn, P. (2001b), "Digital health information and health outcomes", *Journal of Information Science*, Vol. 27 No. 4, pp. 265-76.

Nicholas, D., Huntington, P., Williams, P. and Gunter, B. (2003), "Digital consumer perceptions of the authority of health information: case study: digital interactive television and the Internet", *Health Information and Libraries Journal*, in press.

Nicholas, D., Huntington, P., Williams, P. and Jordan, M. (2002b), "NHS Direct Online: its users and their concerns", *Journal of Information Science*, Vol. 28 No. 4, pp. 305-19.

Nicholas, D., Williams, P., Martin, H. and Cole, P. (1999), *The Media and the Internet*, Aslib, London.

Richie, J. and Spencer, L. (1994), "Qualitative data analysis for applied policy research", in Bryman, A. and Burgess, R.G. (Eds), *Analyzing Qualitative Data*, Routledge, London, pp. 173-94.

Rumbelow, H. (1999), "Doctors usurped by the Internet", *The Times*, 6 November, p. 7 (home news).

Schaefer, D.R. and Dillman, D.A. (1998), "Development of a standard e-mail methodology: results of an experiment", *Public Opinion Quarterly*, Vol. 62 No. 3, pp. 378-97.

Silverman, D. (1999), *Doing Qualitative Research: A Practical Handbook*, Sage, London.

Sproull, L.S. (1986), "Using electronic mail for data collection in organisational research", *Academy of Management Journal*, Vol. 29 No. 1, pp. 159-69.

Taylor, H. (2000), "Does Internet research work? Comparing online survey results with telephone survey", *International Journal of Market Research*, Vol. 42 No. 1, pp. 51-63.

Wanless, D. (Chair) (2002), *Securing Our Future Health: Taking a Long-Term View: Final Report*, HMGO, London, available at: www.hm-treasury.gov.uk/Consultations_and_Legislation/wanless/consult_final.cfm? (accessed 5 February 2003).

Williams, P., Nicholas, D., Huntington, P. and McClean, F. (2002), "Surfing for health: user evaluation of a health information Web site. Part 2 – fieldwork", *Health Information and Libraries Journal*, Vol. 19 No. 4, pp. 214-25.

Wilson, T. (1990), "Object or participant? The information user in information research. Communications from the centre for library research", *Swedish Library Research*, Vol. 2, special issue, pp. 5-15.

Seeking alcohol information on the Internet

Adam N. Joinson and
Phil Banyard

The authors

Adam N. Joinson is Lecturer in ICT in the Social Sciences, Institute of Educational Technology, The Open University, Milton Keynes, UK. E-mail: A.N.Joinson@open.ac.uk
Phil Banyard is Senior Lecturer in Psychology, Department of Social Sciences, Psychology Division, Nottingham Trent University, Nottingham, UK.

Keywords

Internet, Worldwide web, Information gathering, Health education, Alcoholic drinks

Abstract

It has been argued that people may be more willing to seek potentially threatening information on the Internet than they would in "real life". For alcohol drinkers, potentially threatening information includes diagnostic information on the amount they drink, and information about the negative effects of alcohol consumption. In the present study, participants with varying levels of alcohol intake and plans for change chose four alcohol-related articles to read (from 12), using either the World Wide Web (WWW) or pen and paper. Results showed that drinkers not currently reducing their drinking were more likely to seek diagnostic, potentially threatening anti-drinking information via the WWW compared with when seeking paper-based information. Drinkers either contemplating or engaging in efforts to reduce their drinking sought pro-drinking information on the WWW and anti-drinking information when using pen and paper. The potential role of the Internet, and perceived anonymity, in health promotion are discussed.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · pp. 313-319
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310498888

Introduction

According to a recent survey of Internet users in the USA (Pew Internet and American Life, 2002), 63 per cent of Internet users have used the Internet to research health information – and in any one day six million US Internet users access health information online. The most prevalent use of the Internet is to research a specific illness (93 per cent of "health seekers"), followed by information aimed at weight control and nutrition (65 per cent). When questioned about the impact of their information seeking, 34 per cent of "health seekers" said that they had changed their approach to maintaining their own or another's health, and 30 per cent said that they had changed the way they think about their diet, exercise or stress. This pattern of responses matches those found by Nicholas *et al.* (2001) in a survey of users of a health information Web site – 47 per cent of users said that the site had helped with their dealings with their doctor, and fully 58 per cent of users currently suffering from a condition stated that the Web site had helped to improve their condition.

The use of the Internet for health information is not limited to accessing information. There are large numbers of electronic support groups (ESGs) available online (Joinson, 2003). A number of empirical studies have examined, for instance, the use of the Internet by people diagnosed with sports injuries (Preece, 1999), eating disorders (Winzelberg, 1997) and depression (Galegher *et al.*, 1998). These studies suggest that the main features of online social support are that it reduces feelings of isolation and provides information and emotional support (Preece, 1999).

There are a number of factors that may well unite users of online ESGs and health information seekers (indeed, much of the time they may well be the same people). For instance, a proportion of health information seekers have reasonably well developed strategies for evaluating the quality of information on health Web sites (Pew Internet and American Life, 2002), while users of online social support use a variety of linguistic devices to establish legitimacy and authority in online forums (Galegher *et al.*, 1998). Ease and flexibility of access are another possible link: some studies of ESGs have suggested that most use occurs outside office hours, when traditional forms of medical and social support are not available (Winzelberg, 1997). A further motivation (and potential barrier) is the users' perceived anonymity when online. For instance, the Pew Internet and American Life (2002) report notes that 80 per cent of health seeking occurs from a home connection. One participant in a follow-up focus group is quoted as saying, "If I did work, I would probably be too embarrassed to look up stuff online." Another focus group participant echoed her concern, saying, "I know we monitor the use of the Net at work and I have seen it work against people." These quotes suggest that one reason for seeking health information online is the relative anonymity and convenience afforded by home use (Borzekowski and Rickert, 2001). Nicholas *et al.* (2003) have developed the concept of "search disclosure" to help explain why people moderate their search strategy dependent on the perceived anonymity of the search location. Looking at the data from 11 different studies, Nicholas *et al.* found that people search for information on sensitive topics during "private" times of day, and at information kiosks located in places that afford more privacy.

This effect of anonymity on health behaviour is not just limited to the searching for health information. For instance, Davidson *et al.* (2000) found that, for both face-to-face and online social support groups, the number of support groups available positively correlated with the social burden imposed by the ailment, particularly the embarrassment associated with a particular diagnosis or treatment. Similarly, Mickelson (1997) found that users of a "parent support" ESG reported a greater perceived stigma associated with their child's diagnosis, greater visibility, and lower expectations of support from their parents and casual friends, compared with non-ESG users. Joinson and Banyard (2002, Study 2) found that information access on a cancer Web site was more closely linked to prevalence data than queries to a telephone helpline. In the case of stigmatised cancers, this effect was particularly pronounced. Barak (2001) notes that the anonymity afforded by the Internet has seen high levels of usage on his suicide prevention site by adolescents, shy and socially anxious people, and those with a high public profile.

Although Internet users seeking diagnostic clinical information on the WWW or support via ESGs have been reasonably well researched, the seeking of health promotion information on the Internet is something of an unknown. One possible prediction is that the information-seeking behaviour of people either unaware of a risk or not contemplating changing an unhealthy behaviour is unlikely to be highly motivated (Prochaska *et al.*, 1992). For instance, a study of a staff health promotion site showed that users were predominantly those already exercising, rather than those either not taking any exercise or those contemplating taking more exercise than at present (Griffin *et al.*, 2000). Indeed, a large body of social psychological research suggests that people will go to great lengths to avoid potentially threatening (health) information (Taylor, 1989). This is particularly the case if health information is seen as personally relevant (Sherman *et al.*, 2000) or if it would cause anxiety by raising the possibility of future illness (Brashers, 2001), or presumably if there were privacy concerns linked to the seeking of the information (Nicholas *et al.*, 2003).

The aim of the present study is to compare health promotion information seeking on the WWW and paper for people with varying degrees of unhealthy behaviour, and at different stages of change. The health behaviour, and related health promotion information seeking, considered in the present study are alcohol intake. There is considerable evidence that high levels of alcohol intake by university students can have negative consequences (Migneault *et al.*, 1999). In the present study, college students' information seeking of pro- and anti-drinking information is examined in the light of their weekly alcohol unit intake, and their plans for behaviour change. It is hypothesised that the information-seeking strategies of individuals using the Internet will differ from those of participants using "traditional" information-seeking methods. The form this difference takes is predicted to interact with individual differences, specifically the individual's plans for drinking reduction, and their current unit intake.

Method

Design

A three-way, between-subjects design was used in the present experiment. Participants completed the measures using either the WWW or pen and paper, and were categorised according to their unit intake of alcohol (high vs low) and their plans to reduce their drinking (not contemplating or contemplating/engaging in change). Participants' requests for articles to read formed the information-seeking dependent-variable.

Participants

Participants were 117 undergraduate students at two UK universities (25 males, mean ages = 20.74 years (SD = 4.82) and 21.72 (SD = 4.30) for each location). The eight participants who abstained from alcohol were not included in subsequent data analysis. Participants were allocated to either the paper version of the study (*n* = 73) or a WWW version (*n* = 44).

Materials

Participants completed two measures before the information-seeking part of the experiment.

Demographic variables

Participants were asked to enter their age, gender and alcohol intake (options: "do not drink at all", "1-5 units", "6-10 units", "11-15 units", "16-20 units", "21-25 units", "26-30 units" and "31+ units"). It was explained in the text that "1 unit = half a pint of beer, one spirit measure, one small glass of wine".

Stage of change measure

The stage of change measure followed the procedure developed by Prochaska and colleagues (1992). Participants were asked to "please mark the statement that best sums up your current state". The four statements ("I do not intend to reduce my drinking within the next six months", "I intend to reduce my drinking within the next six months", "I intend to reduce my drinking within the next month, and have begun taking small steps", and "I am actually reducing my drinking right now") correspond to the pre-contemplation, contemplation, preparation or action stages of change respectively.

Information seeking

Once participants had completed the health measures, they were presented with a choice of 12 articles for evaluation. For each article, a title and brief summary were provided, along with a box in a column headed "click the box to evaluate this article". The articles represented six different types of alcohol-related information (two each).

Pro-drinking articles

Informative

Sources that give information about the positive physical, social and emotional consequences of alcohol consumption. For example, "Drink to be Healthy. It's official! A report into the reduced risk of heart disease in people who drink moderate amounts of red wine."

Promotional

Messages from commercial sources promoting the purchase and consumption of alcohol. For example, "What drink to buy, and where to buy it: a guide to the wide range of drinks on the market with details about their alcohol content, taste and general quality. The source also includes information about the cheapest places to purchase your drinks."

Behavioural

Sources of information on activities to be carried out with alcohol. For example, "Drinking games: bored of the same old conversation in the pub? Try some of these drinking games that help the evening move along and liven up even the dullest friends."

Anti-drinking articles

Informative

Sources that inform about the level of individual risk, and possible health consequences – allow the individual to calculate risk. For example, "Home is where the heart is, but the bar is for heart attacks: information about the effects of drinking on the heart and how to estimate your own risk of heart problems."

Promotional

Sources that seek to encourage abstinence or restrained alcohol use. For example, "Alcohol and the accident-prone: information about how your chances of having an accident at home, at work or in the car can be affected by even small amounts of alcohol".

Behavioural
Practical advice on how to limit personal consumption and control excessive drinking. For example, "The Tony Adams Story: the England and Arsenal footballer describes the techniques he uses to keep off alcohol."

Procedure
Participants were approached during a training session in Internet use. If they agreed to take part, it was explained that the study was examining the evaluation of articles about drinking. In the WWW sample, participants were then given the World Wide Web address of the questionnaire, and asked to work through the questions. Once the pre-measures had been completed and electronically submitted, participants were automatically shown the list of potential articles for evaluation. Written instructions informed participants that:

> Listed below are 12 articles about drinking and a short summary of each article. Choose four to read and evaluate by clicking the box next to your chosen article. When you have selected the four articles, click the submit button at the bottom of this page. The articles will then automatically be sent to your Web browser for evaluation by you.

In the paper condition, the instructions were the same except that any Internet references were changed to instruct participants to "tick" the boxes, and hand the completed responses to an experimenter for collection of the articles to evaluate.

Once subjects had chosen their articles, it was explained that the aim of the experiment was the act of choosing, not the evaluation, and that articles would not be forwarded for evaluation. In the WWW condition, a series of links to similar articles on the Internet were provided for participants to follow if they wished. In the paper condition, these links were provided in a print-out. Participants were thanked for their help, and any questions answered by the experimenters.

Results

Initial analyses were conducted to investigate differences between the seeking of either anti- or pro-drinking information. Because seeking one type of information reduced the likelihood of seeking the other, an information-seeking index was calculated by subtracting the number of anti-drinking articles chosen from the number of pro-drinking articles chosen. Thus, if a participant wanted to read four anti-drinking articles, and no pro-drinking articles, their index score would be –4. If they sought two anti- and two pro-drinking articles, their index score would be 0. The mean index score was 0.59 ($SD = 2.38$), indicating a slight bias toward pro-drinking articles. Participants' scores on the information-seeking index did not differ according to their university location ($F(1, 114) = 0.05$, $p > 0.82$) or gender ($F(1, 114) = 0.42$, $p > 0.5$). Location and gender were therefore not included in any subsequent analyses.

Because any effect of the WWW on information seeking might interact with individual differences, participants were categorised using two nominal measures from the questionnaire. First, their self-reported alcohol intake was categorised as either high (above and including 11-15 for a female, and above and including 16-20 for a male) or low (below 11-15 for females, 16-20 for males). A second category was created by collapsing participants' scores on the Stage of Change measure into "not contemplating change" and "contemplating or engaging in change". A three-way, between-subjects ANOVA (medium (WWW vs paper) × unit intake (high vs low) × stage of change (not contemplating vs contemplating or engaging in change)) was calculated to examine the interaction between individual differences and information seeking.

Medium ($F(1, 101) = 4.89$, $p = 0.03$, Ms 1.05 and 0.53 for WWW and paper respectively) and unit intake ($F(1, 101) = 7.03$, $p < 0.01$, Ms 0.08 and 1.25 for low and high unit intake respectively), but not stage of change ($F(1, 101) = 0.12$, $p > 0.73$, ns, Ms 0.81 and 0.56 for pre-contemplation and contemplation or engaging in change respectively), showed significant main effects on information seeking. To provide a frame of reference to these results, effect sizes were calculated (Cohen, 1977). As a guide, Cohen proposed that a "small" effect is 0.20; a "medium" effect is 0.50 and a "large" effect is 0.80 (Cohen, 1977). Using Cohen's standardised mean difference (d_s), the effect sizes are 0.22 for medium, 0.49 for unit intake and 0.11 for stage of change.

The interaction between medium and unit intake was marginally significant

(F (1, 101) = 3.35 p = 0.07). This interaction is illustrated in Figure 1.

The interaction between medium and stage of change was significant (F (1, 101) = 7.85, p < 0.01). This interaction is illustrated in Figure 2. The interaction between unit intake and stage of change was not significant (F < 0.1). The interaction between medium, unit intake and stage of change was also non-significant (F < 2).

Discussion

Participants using the WWW to seek alcohol-related articles sought significantly more pro-drinking information than those using pen and paper. This confirms the hypothesis that people would seek different types of health information online compared with pen and paper. In line with earlier work on health behaviour, those with a high alcohol intake sought significantly more pro-drinking articles than those with a low unit intake. There was no main effect for stage of change on information seeking.

The interaction between medium (WWW vs paper) and unit intake (high vs low) was marginally significant. When unit intake was high there was no difference in information-seeking bias between WWW and paper conditions. However, when unit intake was low, participants answering using paper sought primarily anti-drinking articles, while participants using the WWW sought primarily pro-drinking articles.

The interaction between medium and stage of change was significant. Specifically, when participants were not considering reducing their drinking (pre-contemplation), they sought primarily pro-drinking information, with those using the WWW showing less of a preference for pro-drinking behaviour than those using paper. Individuals who were either contemplating or engaging in drinking reduction tended to seek pro-drinking information on the WWW, and anti-drinking information on paper (see Figure 2). It would seem, therefore, that on the WWW people are acting in a manner contrary to expectations: those planning or engaging in drinking reduction seek pro-drinking information, while those not planning to reduce their drinking seek a balance of pro- and anti-drinking information. On paper the pattern of information seeking is as would be expected: those engaging in change sought anti-drinking information, while those not contemplating change sought pro-drinking information.

This pattern of responses might represent a socially desirable response on paper compared with on the WWW. In the present study, the paper requests were handed to the experimenter – in both locations the participants' lecturer. Although procedures were set in place to protect anonymity of participants, the seeking of information on paper was more public, and less anonymous, than the WWW condition. It would be expected that increases in the "publicness" of a behaviour would increase socially desirable behaviour (Paulhus, 2002), a pattern already established in Web-based surveys (Joinson, 1999) and observed in the use of health information kiosks and health Web sites

Figure 1 The interaction between unit intake and medium on information seeking

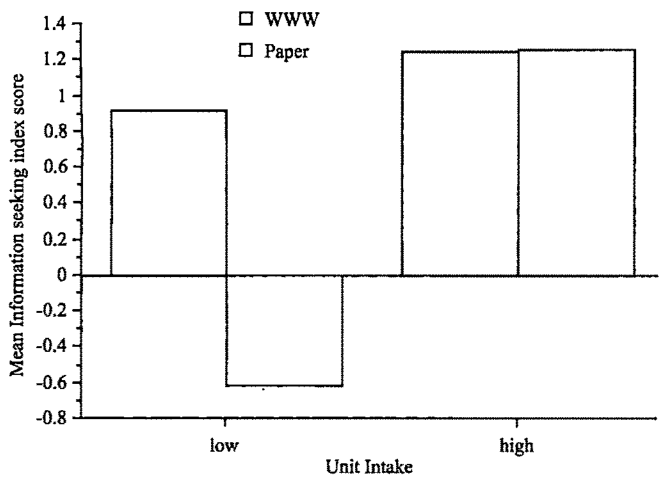
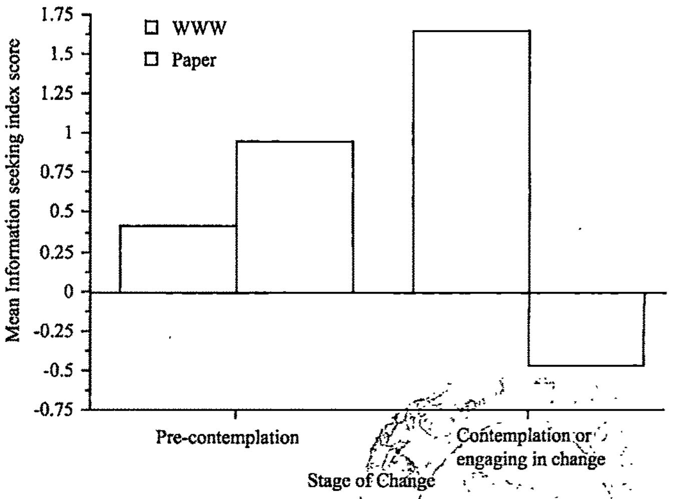


Figure 2 The interaction between stage of change and medium on information seeking



(Nicholas *et al.*, 2003). The confounding of medium and levels of anonymity (and hence social desirability) make the interpretation of any cross-medium results difficult to interpret, and would need to be addressed in any further studies (for instance, by increasing identifiability in the Web condition, or reducing it in the paper condition). However, the pattern of results from the less private paper condition is consistent with the notion of "search disclosure" (Nicholas *et al.*, 2003). It would be interesting to isolate the unique effects (if there are any) of medium and level of anonymity in health information seeking.

Looking at the results from the WWW alone, this study suggests that health information seeking on the Internet is a double-edged sword. While the WWW delivery mechanism encouraged those not planning to reduce their drinking to seek articles with a slightly less positive slant than average, this effect was reversed for those planning or engaging in drinking reduction. The behaviour of those currently engaging in change is unusual – that people should seek predominantly pro-drinking messages, while either contemplating or engaging in drinking reduction, is somewhat counter-intuitive. It may be that many of those classified within this group may have been contemplating change, a stage associated with traditional "social exchange" processes (i.e. the weighing up of pro and anti arguments and outcomes) (Janis and Mann, 1977).

Implications for health promotion on the Internet

Most studies of health information seeking on the Internet have focused on access to sites providing medical information for those diagnosed with a condition, or their carers (Joinson and Banyard, 2002; Nicholas *et al.*, 2001; Pew Internet and American Life, 2002). The results of the present study suggest that the seeking of health promotion information may be motivated in a different way. First, there seems to be an effect of medium – if traditional modes of information seeking have a level of identifiability attached, people seem to behave in a socially desirable manner (i.e. seeking somewhat anti-drinking information). Second, the current health behaviour and plans for change lead to different information-seeking motivations, which may well also interact with medium. In the present study, these interactions led the pattern of information seeking on the Web to appear somewhat counter-intuitive and contrary to expectations. Further research with a larger, more varied sample and tighter control of anonymity and privacy is needed to identify the exact nature and causes of these interactions.

A note of caution must be sounded in the interpretation of the results. In the present research, the Internet sample consisted of students assigned to the WWW condition. This was necessary to allow *post hoc* contrasts with a comparable group using paper measures. However, this design is not a true representation of the environment in which most people access information on the Internet, nor does it replicate possible differences between an Internet and paper sample. Indeed, it could be argued that any effects might be greater, if the sample consisted of a "genuine" Internet sample rather than an allocated sample because of the increased privacy afforded to Internet users outside the laboratory.

The present research shows that the Internet may prove to be an unrivalled environment for the provision of health promotion information aimed at encouraging people to change unhealthy behaviours. However, the WWW may also have previously unforeseen consequences in the seeking of health-related information amongst those contemplating, preparing or engaging in health-behaviour change. Continued research effort that investigates how users browse health promotion information on the WWW is urgently required. The current trend is for health promotion professionals to simply convert existing paper resources to digital format. Although this approach is a commendable effort toward providing access to health promotion material, we would suggest that researchers need to know who is likely to seek specific information using the WWW, and should tailor their resources to meet the motives of those users and their perceived anonymity.

References

Barak, A. (2001), "SAHAR: an Internet-based emotional support service for suicidal people", paper presented at the British Psychological Society Conference, *Psychology and the Internet: A European Perspective*, Farnborough, November, available at: construct.haifa.ac.il/~azy/sahar02.htm (accessed 5 July 2003).

Borzekowski, D.L.G. and Rickert, V.I. (2001), "Adolescents, the Internet, and health: issues of access and content", *Journal of Applied Developmental Psychology*, Vol. 22 No. 1, pp. 49-59.

Brashers, D.E. (2001), "Communication and uncertainty management", *Journal of Communication*, Vol. 51 No. 3, pp. 477-97.

Cohen, J. (1977), *Statistical Power Analysis for the Behavioural Sciences*, rev. ed., Academic Press, New York, NY.

Davidson, K.P., Pennebacker, J.W. and Dickerson, S.S. (2000), "Who talks? The social psychology of illness support groups", *American Psychologist*, Vol. 55 No. 2, pp. 205-17.

Galegher, J., Sproull, L. and Kiesler, S. (1998), "Legitimacy, authority, and community in electronic support groups", *Written Communication*, Vol. 15 No. 4, pp. 493-530.

Griffin, C., Eves, F. and Cheng, K.K. (2000), "Issues in promoting exercise using the World Wide Web", *Proceedings of the British Psychological Society*, Vol. 9, p. 138.

Janis, I.L. and Mann, L. (1977), *Decision Making: A Psychological Analysis of Conflict, Choice, and Commitment*, Cassel & Collier Macmillan, London.

Joinson, A.N. (1999), "Anonymity, social desirability and Internet-based questionnaires", *Behaviour Research Methods, Instruments and Computers*, Vol. 31 No. 3, pp. 433-8.

Joinson, A.N. (2003), *Understanding the Psychology of Internet Behaviour: Virtual Worlds, Real Lives*, Palgrave Macmillan, Basingstoke and New York, NY.

Joinson, A.N. and Banyard, P. (2002), "Psychological aspects of information seeking on the Internet", *Aslib Proceedings: New Information Perspectives*, Vol. 54 No. 2, pp. 95-102.

Mickelson, K.D. (1997), "Seeking social support: parents in electronic support groups", in Kiesler S. (Ed.), *Culture of the Internet*, Lawrence Erlbaum, Mahwah, NJ, pp. 157-78.

Migneault, J.P., Velicer, W.F., Prochaska, J.O. and Stevenson, J.F. (1999), "Decisional balance for immoderate drinking in college students", *Substance Use and Misuse*, Vol. 34 No. 10, pp. 1325-46.

Nicholas, D., Huntington, P., Williams, P. and Blackburn, P. (2001), "Digital health information and health outcomes", *Journal of Information Science*, Vol. 27 No. 4, pp. 265-76.

Nicholas, D., Huntington, P., Williams, P. and Gunter, B. (2003), "'Search-disclosure': a concept to aid the understanding of digital information platform preference and location in a health environment", submitted for publication to the *Journal of Documentation*.

Paulhus, D.L. (2002), "Socially desirable responding: the evolution of a construct", in Braun, H., Jackson, D.N. and Wiley, D.E. (Eds), *The Role of Constructs in Psychological and Educational Measurement*, Erlbaum, Hillsdale, NJ, pp. 67-88.

Pew Internet and American Life (2002), *Vital Decisions: How Internet Users Decide What Information to Trust When They or Their Loved Ones Are Sick*, available at: www.pewinternet.org/reports/toc.asp?Report=59 (accessed 5 July 2003).

Preece, J. (1999), "Empathic communities: balancing emotional and factual communication", *Interacting with Computers*, Vol. 12 No. 1, pp. 63-77.

Prochaska, J.O., DiClemente, C.C. and Norcross, J.C. (1992), "In search of how people change: applications to addictive behaviors", *American Psychologist*, Vol. 47 No. 9, pp. 1102-14.

Sherman, D.A.K., Nelson, L.D. and Steele, C.M. (2000), "Do messages about health risks threaten the self? Increasing the acceptance of threatening health messages via self-affirmation", *Personality and Social Psychology Bulletin*, Vol. 26 No. 9, pp. 1046-58.

Taylor, S. (1989), *Positive Illusions: Creative Self-Deception and the Healthy Mind*, Basic Books, New York, NY.

Winzelberg, A. (1997), "The analysis of an electronic support group for individuals with eating disorders", *Computers in Human Behavior*, Vol. 13 No. 3, pp. 393-407.

Availability and use of information touch-screen kiosks (to facilitate social inclusion)

Markella Boudioni

The author

Markella Boudioni is Senior Researcher, College of Health, St Margaret's House, London, UK.
E-mail: m.boudioni@collegeofhealth.org.uk

Keywords

Social alienation, Employment, Health education, Information, Community care, User studies

Abstract

The availability and the use of touch-screen systems for accessing a range of information in different settings in the UK, in particular from socially excluded groups, are reviewed. A literature review and consultations with stakeholders are conducted. Touch-screens are used widely by the Department of Works and Pensions; they are used for community services on a much smaller scale. NHS Direct provides the largest number of kiosks for health information and promotion; InTouch with Health, Wellpoint Health Centres, Patient Information for Consent Systems are some other examples. Some projects that target socially excluded groups are identified. Factors that determine usage and contribute to successful usage are also identified. The majority of stakeholders express the view that kiosks should be available in a variety of locations, irrespective of their specific content and information.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · pp. 320-333
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310498897

Introduction

Touch-screen technology has been used for a wide range of interactive or non-interactive applications. An annual world-wide increase of 25 per cent in the use of touch-screens was predicted in 1996 (Cranston *et al.*, 1996). Five groups of touch-screens were identified: point-of-sale, information kiosks, industrial, gaming and business applications. Of these, the business and education markets were slowly picking up the technology, while point-of-sale and information kiosks were adopting touch-screen technology at a very rapid pace.

A number of companies specialise in information touch-screens and interactive solutions or interactive public access terminals or kiosks in the UK. Some of them collaborate with the public sector, national institutions and local authorities for the use of touch-screens by the general public in a host of areas (Neoproducts, 2003a; Technology Active Solutions, 2003a; InTouch with Health, 2002).

The availability and the use of touch-screen information systems for accessing a range of information in different settings in the UK were examined. Settings included employment services, community services and health. Availability and use of touch-screens from socially excluded or hard-to-reach groups were also examined in particular.

Methodology

Literature review

Academic, "grey" and commercial literature was explored. Academics with extensive experience in the field were contacted and relevant literature was requested. Other published and unpublished literature was also obtained using Internet searches. Company Web sites were explored. Extensive Internet searches were conducted using the general term "interactive technology" and the terms "touch-screen kiosks", "touch-screens & social care", "touch-screens & community services" and "touch-screens & health".

Consultation with stakeholders (other than users)

A total of 13 consultations with stakeholders were conducted in January 2003. These were:

- academics or others who researched or worked in the field;
- representatives of touch-screen companies (manufacturers, designers and developers of health-related touch-screen systems); and
- others who offer information and choice using touch-screens, i.e. representatives of NHS Direct (NHS Direct touch-screen kiosks), the Department for Work and Pensions (Jobcentre Plus Jobpoint kiosks).

Meetings took place in times and venues convenient to the stakeholders. E-mail and telephone consultations were used either in addition to face-to-face meetings or as an alternative method when other commitments did not allow time for a face-to-face meeting.

Informed consent was sought from all stakeholders when they were invited to take part. Consent to tape-record the consultations was sought and was given in most cases. A professional tape-recorder was used, with a telephone connector attached for the telephone consultations. In some cases, e.g. consultation with a Hindu Priest in a Hindu Temple, the use of the tape-recorder was considered inappropriate by the researcher and a manual record was taken.

Combining literature review and consultation with stakeholders

The literature review was conducted in parallel with the consultations with stakeholders. The consultations shed light on formal and informal literature and some literature led to particular companies and projects and assisted in the identification of stakeholders. The two supplemented each other; thus the findings are presented together. It was generally assumed that touch-screen technology facilitates social inclusion; however, reference is made to projects which target specific socially excluded groups. The findings are themed under four general headings:

(1) Availability and use of touch-screens for employment.
(2) Availability and use of touch-screens for community services (and targeting socially excluded groups).
(3) Availability and use of touch-screens for health information and promotion.
(4) Availability and use of touch-screens with health information and promotion content targeting socially excluded groups.

Availability and use of information touch-screens in the UK

Availability and use of touch-screens for employment

The most widely available information kiosks are the Jobpoint kiosks provided by the Department of Works and Pensions. The decision to move on to touch-screen technology was taken by the Department as part of a review of all business processes (Browes, 2002). The kiosks host the second largest jobs database in the world. A total of 9,000 kiosks have been available in 1,000 UK Jobcentres, providing access to over 500,000 jobs, including European, international and third-party, since February 2002 (Neoproducts, 2003b; Browes, 2002). They were produced by Neoproducts and won many awards (Neoproducts, 2003b). Active user involvement was achieved throughout, through consultations with real users (Browes, 2002). Accessibility, human factors and special needs were fully incorporated by using occupational psychologists specialising in human-computer interaction and specialists in accessibility issues (Neoproducts, 2003b; Browes, 2002).

Pilots and evaluation in Jobcentre settings

Piloting of kiosks in Jobcentre settings began in 1996 (two Jobcentres), and in 1998 (ten Jobcentres) – Open Access Pilot (Browes, 2002). The early kiosks were accessed by swipe card and had integrated telephones and print-out facilities. The first pilots were thoroughly monitored and evaluated. The early evaluations in 16 Jobcentres showed high satisfaction by users and staff (Department of Work and Pensions, 2001). The swipe cards and the integrated telephones were, however, abandoned, as the cards were considered costly and the telephones unpopular. Currently freephone access to Jobseeker Direct is available from separate units.

Pilots and evaluation in non-Jobcentre settings

In 1999, two kiosks were piloted in a non-Jobcentre plus location – Local Access Pilot. They were situated in a community learning opportunity centre in a small ex-mining village in North East Derbyshire, Cillamash.

The kiosks displayed jobs and four Web sites with job-related information and also had integrated telephones (Browes, 2002). Evaluation of this pilot showed that users were highly satisfied. A Jobpoint kiosk is still available there.

Remote Jobpoints were evaluated in two Tesco supermarkets in 2002 (GHK & PRI of Leeds Metropolitan University, 2002). The kiosks offered access to job vacancies for a range of clients that generally did not constitute a large proportion of Jobcentre users, for example, young people and women. Although user satisfaction was high, fewer people using the remote Jobpoints selected jobs for which to apply compared with Jobcentre users of Jobpoints. The main issue raised by staff was the reliability of the machines and the need to minimise the amount of downtime.

Further pilots and plans

Phase 1 pilots include rolling out external Jobpoints in (Browes, 2002):

- *HM Prison Service*: currently available in four prisons and aimed at low risk prisoners preparing for release.
- *Retail stores*: about to extend to a further ten Tesco stores and one Asda/WalMart store.
- *Stansted Airport*: currently in the process of placing two touch-screens.
- *Community learning centres*: one already in place and another one planned.
- *Jobcentre Plus "satellite" sites*: currently in the process of rolling those out in small job centres, which only have job vacancies.

Usage statistics

On average each kiosk gets 350 page hits per day, or 35 job hits per kiosk per day. Monthly each kiosk gets 63 million page hits or 63 million job hits (January 2003). Importantly, 80 per cent of all the hits on the Jobcentre Plus Web site are coming from the Jobcentre kiosks, not from personal PCs with online access (Neoproducts, 2003b).

Users' satisfaction

Users, in general, were satisfied in 2002 (Browes, 2002):

- 81 per cent of users were satisfied with Jobpoints;
- 92 per cent found Jobpoints easy to use;
- 48 per cent reported an increase in satisfaction with Jobcentre Plus services; and
- between 31 per cent and 48 per cent reported an increase in number/types of jobs looked at, geographical area searched, number of applications made, knowledge of types of jobs on offer and their confidence in getting a job.

Other benefits of the system

These kiosks provide access to socially and technologically excluded groups. They empower users, offer access to jobs at local, national and international level and allow access in remote environments. According to the consultations, their use also frees up a lot of staff time and allows staff to deal with those who have difficulties or those with special needs, such as those who cannot stand, those who have literacy or numeracy difficulties, do not understand English etc. The Jobpoints also transform the offices aesthetically.

Limitations of the system

In the open access pilot of the Jobpoints, sitting-down touch-screen kiosks were available. However, it was found that the first people in during the morning were seating themselves in the place for the day. Since the system needs to cater for a large and transient population, sitting-down arrangements were abandoned. However, this may present problems in catering for those who have difficulty standing.

Although the system is available in the Welsh language at Welsh offices, there are currently no plans to make it available in other languages. According to the consultations, this would involve a substantial cost element, which may not solve access issues for non-English speakers, as many people from ethnic minority groups, particularly from the Asian sub-continent, are also illiterate in their own language. On a practical level, it would be impossible to translate all vacancies into other languages.

Future developments

Future developments under consideration include additional Jobpoint functionality, i.e. providing information to support job seeking, development of applications to enable display on third-party kiosks (e.g. in the Sheffield City kiosk), and wireless/Internet delivery of services to support staff and clients outside the Jobcentre network.

Availability and use of touch-screens for community services (and targeting socially excluded groups)

Providing accessible electronic information about community services, social support and local services to people who do not have access to appropriate technology at home or who lack knowledge about how to access electronic information in itself facilitates social inclusion. Some examples of touch-screens aiming to provide information to the general public and located in public places are presented. Some of these systems also provide health information; some other systems have specific channels that target specific socially excluded groups. These are:

- I-plus information points;
- touch-screen kiosks in deprived and rural areas;
- touch-screen kiosks for older people;
- kiosks aiming to facilitate social democracy; and
- Choice Bedding Letting for Brighton and Hove Council.

I-plus information points

I-plus information touch-screen points are available in more than 150 UK locations (Cityspace, 2003). Cityspace operates the points in partnership with City Local Authorities and Municipalities; they allow them to align with the Government's Modernising Agenda. They are usually located on high streets, in bus hubs and local shopping centres. They provide easy local access to digital services such as e-mail, links to local authority Web sites and booking and ticketing facilities. Users are able to read the news, look at tourist and online travel information, as well as informing the council about issues such as graffiti, abandoned vehicles, pot-holes, and other "street problems" (Cityspace, 2001a, b). Recent additions include a Public Journey Planner (Cityspace, 2002a). Future online applications will include facilities for council tax payment, parking fines, e-voting, e-forms, and information about benefits entitlement.

I-plus kiosks are currently available in many London Boroughs (Cityspace, 2002b, c, 2003). There are also networks in Bath, Bristol, Manchester, Reading and Knowsley – Knowsley was the first location out of London (Cityspace, 2001c, 2002d; Knowsley, 2000). Some channels target specific groups.

I-plus points for those who suffer from domestic violence. This channel, currently available in most kiosks, acts as a digital signpost to information and advice for those in violent and abusive relationships (BBC News, 2002). Being located near transport centres and transport hubs, the points provide the perfect opportunity for people to look at the channel in a safe environment where their identity is protected (Cityspace, 2002e, f). This channel has proved particularly popular with users. In less than a month from its nation-wide launch (March 2002), nearly 5,000 women sought advice and information on the issue of domestic violence. In its first month, an average of six women per day per kiosk accessed the channel.

I-Plus for homeless people in London. The Web site: www.homelesslondon.org.uk was launched in June 2002 (Innovations, 2002; Cityspace, 2002g; Payne, 2002). It has been compiled and maintained by the Resource Information Service. It is currently available on 70 Cityspace I-plus touch-screen kiosks located on London's streets (a number which is set to rise to 150) as well as through personal computers in day centres and hostels. In future it will be available through 3G Internet services accessible by mobile phones. The kiosks have a print-out facility and a free e-mail service, which enables users to send an e-mail, anonymously, to reassure relatives and friends of their safety. This initiative, which forms part of the Lord Mayor of London's Strategy on Homelessness (the Rough Sleepers Strategy), is the first of its kind. The site contains details of over 3,000 services, including details of accommodation, employment and specialist support. It allows users to identify and locate their nearest hostel, find out information about rehabilitation centres and community services, helplines and counselling facilities. The services can be accessed by location, by client group or by service category. The kiosks also provide local government information, news, transport information and a job channel.

Touch-screen kiosks in deprived and rural areas

NHS Education Action Zones and Healthy Living Centres. A community pharmacy group partners the Dudley Education Action Zone (EAZ) to provide a touch-screen in the Netherton (a deprived inner city area) CHAT Centre for their "Start Here" social support programme (The UK Parliament, 2003). The system provides some health information. They run a project at the local senior school to collect information, transfer it on to the touch-screen and demonstrate it to customers, linking in with Age Concern. This develops community spirit, trains a deprived group in IT and develops mentoring skills, often with younger age groups.

Touch-screens are also available in the Littleport (a rural area) Healthy Living Centre, East Cambridgeshire. This system aims to improve the provision of, and access to, combined social and health information. The information collected from the "Start Here" touch-screens in the Dudley EAZ can provide a useful comparison with a similar exercise to be carried out in Littleport, highlighting the needs of deprived inner city versus rural areas.

South Yorkshire Coalfields Online Project (SYCOP). This project is based in Exborough, a poor coal-mining area, with high unemployment and associated problems. A community information portal is being developed (SYCOP, 2003). The Web site covers key life events like losing a job, going to hospital, financial problems, etc. and aims to facilitate social inclusion. InTouch with Health is providing the health information, which can be accessed via the Internet at home, via kiosks and information points in public buildings and via digital TV.

"MAGIC Touch" public information kiosks. Six kiosks are located in targeted deprived areas throughout Manchester (Dewhirst, 2003). They were set up as part of a public-private-voluntary sector initiative (Manchester City Council, Manchester Community Information Network, and SEMA Group UK Ltd – an international computer software company). Information includes job vacancies, training courses, local services, council services, health contacts and leisure facilities, information from private companies and some advertising. A special feature of these kiosks is that anyone who logs on to the system has the option to create a personalised proforma, so that they can have the information they require customised to meet their needs, thereby saving time when looking for information. Use of a free e-mail system and printer is also available.

Touch & Go in Glasgow. A local community Web site project was launched in Glasgow in April 2001 (*Glasgow Social Inclusion Update,* 2001a). It aims to bring together information on local services using Internet kiosks to provide easy access for the local community. Touch-screens are sited in three Greater Easterhouse area suburbs. An offline version of the Web site is also available. Both formats incorporate a news and events section, to which all local groups can contribute. Community groups have provided the information for the Web site and they are also involved in updating it.

Touch-screen kiosks for older people

Older people suffering from social exclusion in Tameside. The Tameside Metropolitan Borough Council secured Single Regeneration Bid funding to provide better quality information to older people suffering from social exclusion (InTouch with Health, 2003a). InTouch with Health worked with them to develop relevant information services that can be accessed via kiosks and public access offline computers.

Nuneaton and Bedworth Borough Council's Silver Surfers Project. This project aims to promote Internet usage and access with the over-50s. A full multi-channel solution, including PCs, Digital Interactive TV and kiosks, would be provided in January 2003 (Neoproducts, 2003c).

Kiosks aiming to facilitate social democracy

Sheffield Public DataWeb. It attempts to cover all citizens' digital needs and to make a contribution to closing the digital divide, whilst also being commercially deployable (Sheffield Public DataWeb, 2003). It targets the majority of people in the city who either do not have access to a personal computer or do not have the skills to use one. The technology was developed under a Fourth Framework EU Research. The concept is based on gathering all services and information together at one access point. The system includes popular information such as football scores, lottery results and horoscopes, which aim to encourage use of the system and allow users to become familiar with the system. They can then use their skills to take part in the more serious administrative and consultative applications, such as contributing to the work of the UK Parliament. To emphasise that the application requires no initial Internet skills, the system was launched by the oldest man in the city, who was 105 years old.

Choice Bedding Letting for Brighton and Hove Council

Neoproducts produced 30 touch-screens, which are available at Brighton and Hove Council for their Choice Bedding Letting (Neoproducts, 2003a). People who live in council accommodation can access the screens to see what accommodation is available for swapping.

Availability and use of touch-screens for health information and promotion

Information about health information and promotion is increasingly provided using touch-screen technology. The first touch-screen health information system was probably Healthpoint, developed by Professor Ray Jones at Glasgow University in 1991 (Jones *et al.*, 1993b). In early evaluations, evidence showed that people had a high recall of what they had read on screen ((Jones *et al.*, 1993a).

The most widely available touch-screen kiosks currently are:
- NHS Direct kiosks;
- InTouch with Health kiosks;
- Wellpoint Health Centres; and
- The Patient Information for Consent Systems.

NHS Direct Kiosks

A total of 186 NHS Direct kiosks are currently available in various locations in the UK. This service forms part of the Government's NHS Plan, aiming to provide a convenient out-of-hours health service (Action Multimedia, 2003). The kiosks facilitate e-government, together with other new technology projects currently piloted, i.e. information through digital interactive TV and 3G mobiles; they also assist in managing staff capacity in NHS Direct Helplines. The NHS Direct information points have twin aims: to give the public greater information about how they can look after their own health and also to give information about health services.

The health information on the kiosks is similar to that found on the online NHS Direct Web site. The kiosks are situated in key public locations such as pharmacies, supermarkets, holiday resorts, libraries, shopping malls, universities, sixth form colleges and more traditional NHS locations such as A&E departments and NHS Walk-in Centres. The Department of Health commissioned independent consultants to help develop the specifications for the kiosks, including disability and access options. Action Multimedia has provided kiosk hardware, consultancy, pre-installation site surveys, remote monitoring and software updates. The first NHS kiosk was installed in September 2000 and the project was launched in October 2000 (Action Multimedia, 2003). A total of 81 kiosks were installed by February 2001, 136 by October 2001, and 180 by January 2003. A number of the NHS Direct Information Points feature telephone handsets, enabling the public to contact their local NHS Direct Call Centre free of charge, for additional support and health-care advice.

Evaluations and usage statistics. Initial evaluation of usage of 136 NHS kiosks up to October 2001 (NHS Direct, 2001) showed that:
- Kiosks were used on average 12 times per day, but many kiosks could have been better sited; a third of those visiting sites had noticed the kiosk and 6 per cent had used it.
- A quarter had obtained health information from the Internet, 36 per cent had not used the Internet for health information nor would they use the kiosk, but 39 per cent would use the kiosk now they knew it was there.
- Sites such as supermarkets and leisure centres which are visited frequently by people aged over 60 would be most likely to reach those who do not use the Internet for health information.
- Although a greater proportion of those visiting health centres and community centres used the kiosk, the greatest use was in NHS Walk-in Centres, leisure centres and supermarkets because of a much greater number of visitors at those sites.

In conclusion, it was found that, although more work is needed on where to site kiosks in order to make sure people are aware of them, the kiosks can increase accessibility of health information.

Each kiosk automatically monitors its own usage. Reports are produced regularly for each kiosk by Action Multimedia (Hardy, 2003a, b, c). Most recent statistics show that the kiosks had 920 users per month on average (per kiosk) in spring and summer

2002, but there are many variations in usage by location and area.

Limitations. Although these kiosks can increase accessibility, better siting could improve awareness (NHS Direct, 2001). According to the consultations, there are some other limitations:

- *Social inclusion.* Although the NHS Direct Helpline uses audio-tapes with information in ethnic languages and NHS Direct Online has some non-English content, information on the kiosks is currently only available in English.
- *Location.* The decision on where to locate kiosks is currently taken by the local NHS Direct Centres. This results in lack of comparability between different areas. Location is very fragmented, and local users do not have a choice in where kiosks are located.
- *Design.* The current kiosks are quite old-fashioned and bulky; this presents some problems in some locations when space is limited.
- *Interactivity.* They are not live or Web-connected; the software is loaded in a CD-ROM, thus not media-interactive.
- *Local information.* Local information, i.e. about hospitals or services in the locality, is not currently available.

Future. There is an NHS Plan commitment for provision of NHS Direct information through 500 kiosks by 2004. According to the consultations, the information may be available in NHS Direct kiosks and/or other kiosks by either increasing the number of NHS Direct kiosks or having licensing arrangements with third parties to provide NHS Direct information using the real estate available on other existing kiosks. The second option may result in losing some of the NHS branding image, but would increase accessibility – one of the objectives of the NHS Plan.

There are discussions currently on how to overcome the other limitations mentioned above. NHS Direct aims to identify ways of making information available to black and minority ethnic groups (NHS Direct, 2002) using new technologies such as digital interactive TV, 3G mobiles and hand-held devices. Short-term priorities include access to computers in local communities and access to training needs for computer usage to be publicised. Long-term priorities include building Web access for disadvantaged groups. The possibility of having touch-screen kiosks with NHS Direct information in local communities, with content in local ethnic languages, is also discussed.

InTouch with Health kiosks

About 170 InTouch with Health kiosks are available, 45 per cent of which are located in a primary care setting, 45 per cent in hospitals and acute trusts and the rest in a mixture of sites such as libraries, community sites and pharmacies (InTouch with Health, 2002). They combine a simple "touch button" method for viewing information and printing out factsheets and a selection of Web sites, which can be chosen by the client and accessed using the kiosk's in-built keyboard and roller ball. The newest versions of kiosks are Web-enabled. Some InTouch with Health systems are listed as follows:

- *Patient Advice and Liaison Service in Bradford* has been organised on a metropolitan basis (InTouch with Health, 2003b). Kiosks have been installed in three hospitals; the scheme will be extended into primary care in 2003. They provide comprehensive national and local information as well as allowing patients to give feedback to the central PALS team. Information is available in some minority languages.
- *Patient Advice and Liaison Service in Whipps Cross University Hospital NHS Trust* has also installed kiosks as part of a wide-reaching communication plan that incorporates PALS information with interactive material explaining the treatment carried out in the specialty areas associated with the hospital.
- *West Pennine Health Authority* has installed a network of kiosks across primary and secondary care as part of a Local Implementation Strategy project to involve patients in their treatment and help them to manage their conditions better (InTouch with Health, 2003a).
- *Harrogate General Hospital* has recently opened an information centre containing a Web kiosk and sit-down booths for extended use. Special developments include access to patient videos via the kiosks.
- *Oldham NHS Trust* has installed a number of kiosks throughout the hospital in order to provide public access to

quality health information, which also includes sections in Gujarati, Bengali, Urdu and Chinese (InTouch with Health, 2003c).
- *Edinburgh Royal Infirmary* has placed two kiosks in the information centre and the A&E department.
- *Hadfield Medical Practice* has installed a kiosk, which is manned by members of the Patient Partnership Group (InTouch with Health, 2003d). It is located in the "Information Room" in the Medical Centre, an area of the waiting-room devoted to health education and information. A printing facility is available.
- *Phoenix Surgery* has set up an information area within the practice with an InTouch kiosk as its centrepiece.

Wellpoint Health Centres

The Wellpoint Interactive Health Centres (Neoproducts, 2003d; Greener, 2002) feature:
- *Health tests option.* This measures blood pressure, heart rate, weight, body mass index and body fat composition. Other tests are available and will be introduced, as the machines become more familiar to users.
- *Health information option.* This features a searchable database of over 500 common ailments for health information, provided by the College of Health. A database of 2,500 health-related self-help groups will be also introduced.

The users can store their personal history, up to ten results on the system, accessed via a PIN code. The kiosks also include a printer facility, coin mechanism, stereo speakers, guardian kiosk management module and lighting display "wings". The units have been built with upgrade-ability in mind and a new set of health-monitoring options is already in the pipeline. They currently operate with software installed locally (CD-ROM), but Web-versions will be available in the future.

The system dovetails with the Government's desire to create empowered patients. Used as a highly advanced monitoring tool, the system could offer pharmacists the chance to improve patients' health as well as advancing the profession more generally. As the company's managing director said:

> The system is unique and represents a major opportunity for pharmacists to firmly establish themselves as the first port of call for health monitoring and advice.

The Wellpoint Centre is currently available in 30 UK independent pharmacy outlets and is being rolled out to an initial total of 200 independent pharmacy outlets. It is targeted to be available in over 2,500 locations by the end of 2004.

Patient Information for Consent System

Touch-screens are used as a secure delivery platform for a Patient Information for Consent System (Neoproducts, 2003e; Patient Info, 2003). The main purpose of the system is to offer patients information on medical procedures in a clear and concise way, to educate and empower and to facilitate consent through education. They provide benefits not only for patients, but also for clinicians, as the system can enable more effective and efficient doctor/patient discussion due to pre-consultation patient education, improve the doctor/patient relationship and reduce the likelihood of complaints and litigation due to a full and proper consent process.

The software is installed on touch-screen kiosks, which present the information and also print out patient information leaflets. It uses text, voice-over and photographs/diagrams to describe the particular procedure that a patient is to undergo. It includes associated information about risks, complications and alternative treatments. It allows the patient or doctor to print patient information sheets and government pre-written consent forms, which can be customised for the host hospital. The kiosk has full disabled access, especially for patients in a wheelchair and for those seated at the unit. There are also stereo speakers and a pair of stereo headphones. The Patient Consent Form is printed on a grade of paper designed to last for up to 25 years.

The systems are currently being rolled out in hospitals and private clinics, as either Internet or intranet versions. Approximately ten systems are currently available in London (Hackney PCT, Whipps Cross University Hospital, and the London Spine Clinic), Essex (intranet version) and Wolverhampton.

Other touch-screen kiosks

Other touch-screen kiosks are available on a much smaller scale or for people with specific conditions:

- *City-Wide Health Information Service in Glasgow.* This project has been jointly developed by the Mitchell Library and the Primary Care Trust's Sandyford Initiative (*Glasgow Social Inclusion Update*, 2001b). A wide range of health topics is available on the Web site with links to other health Web sites through touch-screens. It is expected to expand the number of touch points and facilities to be made available in all libraries in Glasgow and more Primary Care Trust sites.
- *Scream Ltd kiosks.* These kiosks mainly provide local information about the trusts or the councils (Scream, 2003). They are available to users of 12 Trusts and councils around the UK.
- *Touch-screens with rheumatology information.* St Thomas's Hospital in London, Rheumatology Department, have created a simple touch-screen for rheumatology-related topics (Technology Active Solutions, 2003a).
- *Touch-screens with cancer information.* They are available in the Cancer Patient Information Centre of Wales (Technology Active Solutions, 2003a).

Availability and use of touch-screens with health information and health promotion content targeting socially excluded groups

We have identified some projects, which specifically target socially excluded groups and other population sub-groups:

- touch-screen kiosks with information in ethnic languages;
- touch-screen kiosks for older people; and
- touch-screen for other (socially excluded) sub-groups.

Touch-screen kiosks with information in other languages

Most of the systems detailed can be voiced or translated into various languages, thus combating the problem of availability to ethnic minorities whose first language is not English (Patient Info, 2003). One of the big problems with people from ethnic minorities, especially older people, is that, even if they can speak the language, they probably cannot read it or write it. Therefore it is beneficial to translate in written form and also have spoken word translations. However, this can be expensive.

Touch-screens with health-related information in ethnic languages have been produced by InTouch with Health. Information in some ethnic minority languages is available on PALS Bradford kiosks; information in Gujarati, Bengali, Urdu and Chinese is available on Oldham NHS Trust kiosks. However, the "Three cities" project has made health-care information widely available to ethnic minorities.

The "Three Cities" project. A partnership undertaken by health specialists InTouch with Health and Sheffield, Nottingham and Leicester Health Action Zones and initially funded for three years (InTouch with Health, 2003c) has led to minority groups gaining access to more health- and social-care information and advice in their own languages. As the project manager said:

> We had to find a way to break down the communication barrier faced by ethnic minorities and there were a number of problems to overcome. Some languages only have a verbal tradition; so many people are unable to read their mother tongue. We tried to develop something that will enable people who are not necessarily literate in their own language to access the information, which is a real challenge ...

Four languages were decided upon: Chinese, Bengali, Gujarati, and Urdu/Punjabi in addition to English. Each Health Authority led the development of their chosen language. Local steering groups, including community representatives and health workers, were then set up to look at the specific health needs of each City and prioritise the information subjects to be available. Research revealed a number of conditions prevalent amongst the ethnic groups in all three areas: heart disease prevention, diabetes, tuberculosis and cervical screening.

The kiosks include a handset to enable users to listen to the health messages and clear touch-screen instructions for written information. Information can be printed off and taken home. To encourage people to use the kiosk, a continuous video clip, which shows someone from each community walking up to the kiosk, touching the screen and picking up the handset, was built. Users can select the language of their choice and then choose the topic from a simple menu. There is also a demographic form for people to fill before they use the information further.

The sites for the touch-screen health kiosks have been carefully selected and are changed during the project. Locations include libraries, health and medical centres, neighbourhood centres, ethnic minority centres, and a mosque.

The touch-screens are being evaluated by the University of Sheffield. The system is monitored online and a questionnaire study was conducted over 18 months (July 2001-December 2002). Current feedback indicates great support from people who can hear and see basic health information in their own language for the first time; interestingly, many users share the information with family and friends. The kiosks were particularly successful with the Hindu community when they were located in a Hindu temple.

Limitations. There are only three points of interaction, one in each city; the continuous rotation of the screens does not allow for continuity of use and shared ownership of the project with users. Continuation and expansion of the project depend on funding.

Touch-screen kiosks for older people

It has been shown that computer and Internet usage is dramatically affected by age (Coleman *et al.*, 2002). Senior citizens are considered not as technically adept as their younger counterparts and are often frightened by computers, especially keyboards (Mendelsohn, 2001). Evaluation data, however, on touch-screen use in public settings show that older people use them; 15 per cent of users at Creswell Crags Visitor Centre, where touch-screens were placed, were over 60 years old in 1995 (Technology Active Solutions, 1995). However, only one project with health prevention and health-care information targeting older people was identified and this is still under development.

Falls program for older people in Tower Hamlets communities. Implemented as a Web site and a touch-screen kiosk (supplied by InTouch with Health) application, the Falls program aims to provide health information to older residents, their carers and families in the London Borough of Tower Hamlets, who are at risk of a fall (Wilmes *et al.*, 2003). By providing facilities to screen for and flag risks of falling, the final application will also be able to channel vulnerable individuals into the health-care system. It is expected that the application will increase awareness of the consequences of falling, in both those at risk and those in primary care. Initially three access points will be available: one in the hospital, one in a local library, and another one in a GP practice. There is scope for other areas to be developed at a later stage, such as information about stroke and medications for older people.

Focus groups and in-depth interviews are organised to investigate older people's attitudes towards health information on falls and their experiences with computers/the Internet and accessing online health information. The diversity of the Tower Hamlets population is also taken into account. Throughout the entire process of design and implementation a series of usability tests (questionnaires and observational research) will be conducted to evaluate the program's usability and accessibility, i.e. intuitiveness, design for users with visual and cognitive impairment, design for users with reduced motor coordination skills, presentation of content for people who cannot read, provision of content in languages prevalent in the community, usage of different multimedia elements (to cater for different learning styles).

Touch-screen kiosks for other (socially excluded) sub-groups

InTouch with Health provides other kiosks targeting specific subgroups of the population (InTouch with Health, 2003a):

- *Hindley Prison kiosks.* Kiosk technology was employed to provide reliable information to both prisoners and visitors. Special drugs information was added on to the kiosk at the prison's request.
- *South Essex Mental Health Partnership Trust.* A total of 45 kiosks were supplied with special mental health content. More ethnic content to reach the big Polish community in the area they serve will also be created.

Elements of successful usage and factors which determine usage

A number of important elements that may contribute to successful usage of touch-screen technology were identified:

- A simple interface that takes into account the computer skills and the educational level of possible users (Cranston *et al.*, 1996).
- Screen design, colours, the use of levels within a hierarchy and easy navigation (Cranston *et al.*, 1996; Technology Active Solutions, 2003b).
- Internet access, or at the very least intranet access.
- An interactive multimedia program and software to provide an automatic return to loop or screen saver when the kiosk has not been touched for a certain length of time.
- A built-in survey tool to collect feedback from users (Cranston *et al.*, 1996).
- Monitoring tool, log file generation to track users, and statistics generation for management and potential advertisers.
- Accessibility and ease of use for everyone are equally important – "Keep it Simple (&) Stupid" (Mendelsohn, 2001).
- Requirements of groups with little or no computer literacy and those with special needs, visual impairments or other disabilities (Ekberg, 1998; JSC, 2003).

Most of the companies have their own quality criteria (InTouch with Health, 2002) or a user group (Technology Active Solutions, 2003a) to advise them on design and development, as they realise that users' needs, experiences and confidence are not uniform. As one user said (Technology Active Solutions, 2003b):

> You can't just stick a terminal in a public place and expect people to use it. They won't. Nor can you expect a 60-year-old with arthritis to "rotate the ball until the pointer is over the menu you require, scroll down to the action you need and select it with a rapid click of the primary button".

At least one of the companies has put together approval criteria for disabled access such as access to a touch-screen by lying on their sides, sufficient width and depth for the wheelchair, appropriate height and within easy reach screen, size of the screen, type of touch technology and physical stability (Technology Active Solutions, 2003b). Other companies also consider disability and access issues, and their screens are tested rigorously to meet specification criteria (Neoproducts, 2003a). Access and use by children and elderly people have also been considered. Elderly people may have specific needs; as one of the developers said:

> Somewhere to put their walking-stick on, as they commonly like to lean on the touch-screen, as it is more steady than their walking-stick.

Other factors that may influence the accessibility of touch-screen information for patients were outlined in evaluations of kiosks (Pearson *et al.*, 1999; Nicholas *et al*, 2001):

- faith in the content (i.e. the question of authenticity);
- ease of use – hardware, navigation and other aspects of the interface are important;
- convenient location at a convenient time; and
- cost – plainly an attraction of kiosks is that they are free to use.

Consultations with stakeholders highlighted, in addition, the importance of the following:

- the quality and the usefulness of the content;
- the degree of ownership or responsibility the organisation has for the kiosk and its promotion;
- access to information to which authorities/organisations want people to have access; and
- access to information (information, data about themselves) to which people would like to have access.

The future of touch-screens

There was an agreement between the stakeholders that community- and health-related information, which should be readily available to people, would be provided widely in the near future via new technology.

Other points made were:

- More touch-screens with a keyboard or trackball will be more widely used, as the computer-literate younger generation grow older. These will be accessed via ID cards or Smart cards, or free.
- TVs with Web browsers are also another possibility. The view was expressed that, although digital TV (free to view channels) is a good idea, users still need to be equipped with the tools – which are, however, relatively low-cost – to access the Web.
- Biometrics, eye scanners and print scanners are considered to be more advanced technologically and they will be more widely available in the long term.

The majority of stakeholders expressed the view that kiosks should be available in a variety of locations irrespective of their specific content. Only one stakeholder felt that kiosks that provide information about health should be located in sites which people already associate with health, for example, surgeries, pharmacies, and health-related areas of supermarkets.

Conclusions

This study shows that kiosks in general are starting to play a major part in allowing public access to information. Touch-screen kiosks have been used to provide information and choice in employment, community services, local services and health. They have been used to provide information and offer choice.

New technology and touch-screens in particular seem to be appropriate vehicles for provision of information in various settings, as they provide a number of benefits:

- kiosks can be used by people who do not have access to a computer at home or work;
- kiosks can provide quick access and access to information 24 hours per day;
- they are easy to use;
- users with little or no computer literacy do not feel intimidated by the technology (Cranston *et al.*, 1996);
- touch-screens are non-threatening and do not frighten older users away (Mendelsohn, 2001); and
- they also facilitate a sense of ownership and choice.

Touch-screens facilitate social inclusion, even if they do not specifically target specific groups. They are addressing a socially excluded group, those who have no access to or the skills to use computers. Siting kiosks in public is helping to bridge the gap between the "IT haves" and the "IT have-nots".

In addition, information kiosk technology can provide the means through which it is possible to access socially excluded groups in a non-threatening and informative way. The kiosks can be placed in situations where people can access information who may otherwise miss out. They offer a degree of anonymity, which is not possible through other methods. There is also the potential to be used widely by specific subgroups of the society. This technology provides us with an opportunity to provide social and health benefits (Nicholas *et al.*, 2000).

Care should be taken to ensure that some parts of society are not disadvantaged as a result of wrong assumptions about the ubiquity of the Internet. Computer and Internet usage is dramatically affected by age. The proportion of those above the state pension age with any experience of the Internet is significantly lower than average (Coleman *et al.*, 2002). Computer and Internet usage is also dramatically affected by command of the English language. To a lesser extent, the level of Internet usage is also affected by socio-economic factors such as work status, income levels and qualifications obtained. However, these may change in the future, as more and more people, irrespective of the factors mentioned, are aware of electronic service delivery and new technology. A key part of ensuring take-up will be to ensure high levels of awareness of these services among those groups likely to want to use them (Coleman *et al.*, 2002).

One of the most difficult challenges in public health is how to get the message across to socially excluded people in a form that will be meaningful to them. It seems that touch-screen technology, with kiosks located in easily accessible public locations, may overcome this problem. However, further research on touch-screen technology and its usability with regard to various subgroups of the population, including socially excluded groups, is needed.

References

Action Multimedia (2003), *Case Studies – NHS Direct*, available at www.actionmultimedia.com (accessed 13 January).

BBC News (2002), *Net Lifeline for Victims of Violence*, 8 May, available at: news.bbc.co.uk/1/hi/sci/tech/1972920.stm (accessed 10 January 2003).

Browes, K.E. (2002), "Kiosks in Jobcentre Plus – the Jobpoint Project and beyond", paper presented to the KioskCom Europe 2002, June.

Cityspace (2001a), *24-hour Access to Council Services*, available at: www.cityspace.com/html/news/press_releases/body20.htm (accessed 13 February 2003).

Cityspace (2001b), *I-plus Points Offer Access to Thousands of Jobs per Day*, available at: www.cityspace.com/html/news/press_releases/body17.htm (accessed 13 February 2003).

Cityspace (2001c), *Bristolians Say I-plus Points Are a Hit*, available at: www.cityspace.com/html/news/

press_releases/body21.htm (accessed 13 February 2003).

Cityspace (2002a), *Plan Your Journey at the Touch of a Button*, available at: www.cityspace.com/html/news/press_releases/body33.htm (accessed 13 February 2003).

Cityspace (2002b), *Surfing on the Streets of Bromley*, available at: www.cityspace.com/html/news/press_releases/body28.htm (accessed 13 February 2003).

Cityspace (2002c), *London Borough of Richmond upon Thames Goes Online in the Community*, available at: www.cityspace.com/html/news/press_releases/body25.htm (accessed 13 February 2003).

Cityspace (2002d), *Innovative Information Kiosks Come to Bath and NE Somerset*, available at: www.cityspace.com/html/news/press_releases/body31.htm (accessed 13 February 2003).

Cityspace (2002e), *Little Mo from EastEnders Launches Service to Help Abused Women Everywhere*, available at: www.cityspace.com/html/news/press_releases/body26.htm (accessed 13 February 2003).

Cityspace (2002f), *Digital Domestic Violence Service – "I want more people to know it is there", says Ken Livingstone*, available at: www.cityspace.com/html/news/press_releases/body26.htm (accessed 13 February 2003).

Cityspace (2002g), *Ken Livingstone Unveils New Digital Service for London's Homeless Community*, available at: www.cityspace.com/html/news/press_releases/body29.htm (accessed 13 February 2003).

Cityspace (2003), *I-plus for Local Authorities*, available at: www.cityspace.com (accessed 13 February).

Coleman, N., Jeawody, F. and Wapshot, J. (2002), *Electronic Government at the Department for Work and Pensions – Attitudes to Electronic Methods of Conducting Benefit Business*, DWP Research Report 176, CDS, Leeds.

Cranston, M., Clayton, D.J. and Farrands, P.J. (1996), "Design and implementations considerations for an interactive multimedia kiosk: where to start", paper presented to the Adelaide Conference, available at: www.ascilite.org.au/conferences/adelaide96/papers/04.html (accessed 3 January 2003).

Department of Work and Pensions (2001), *Jobpoint Pathfinder Evaluation, Summer 2001: Reactions to Jobpoint and Usability*, Department of Work and Pensions, Jobcentre Plus, Leeds.

Dewhirst, P. (2003), *Magic Touch Public Information Kiosks*, available at: www.infocities.g-ming.net.uk/magic.html (accessed 10 January).

Ekberg, J. (1998), "Public terminals", *Include*, available at: www.stakes.fi/include/pam3.html (accessed 3 January 2003).

GHK & Policy Research Institute (PRI) of Leeds Metropolitan University (2002), *Evaluation of the Remote Jobpoints Experiment in Port Talbot and Luton, Survey Results from Stage 1 and Stage 2*, final report, prepared for the Department of Works and Pensions, London.

Glasgow Social Inclusion Update (2001a), "New Web site for Easterhouse", *Glasgow Social Inclusion Update*, September, Vol. 8, p. 10.

Glasgow Social Inclusion Update (2001b), "City-Wide Health Information Service", *Glasgow Social Inclusion Update*, September, Vol. 8, p. 1.

Greener, M. (2002), "Screen test", *Community Pharmacy*, September, pp. 38-9.

Hardy, J. (2003a), *NHS Direct Kiosk Report, Beddington Community Centre*, Action Multimedia, February.

Hardy, J. (2003b), *NHS Direct Kiosk Report, Boots, Birmingham*, Action Multimedia, February.

Hardy, J. (2003c), *NHS Direct Kiosk Report, Bradford Library*, Action Multimedia, February.

Innovations (2002), "New Web site for homeless people in London", *Innovations in Information*, Vol. 8 No. 2, p. 5.

InTouch with Health (2002), *About Us*, available at: www.intouchwithhealth.co.uk (accessed 17 December).

InTouch with Health (2003a), *Case Studies*, available at: www.intouchwithhealth.co.uk (accessed 11 February).

InTouch with Health (2003b), *Patient Advice and Liaison Services*, available at: www.intouchwithhealth.co.uk (accessed 11 February).

InTouch with Health (2003c), *Our News*, available at: www.intouchwithhealth.co.uk (accessed 11 February).

InTouch with Health (2003d), *Helping Patients to Take Care of Themselves*, available at: www.intouchwithhealth.co.uk/pr2.htm (accessed 11 February).

Jones, R., Navin, L.M. and Murray, K.J. (1993a), "Use of a community-based touch-screen public-access health information system", *Health Bulletin*, Vol. 51 No. 1, pp. 34-42.

Jones, R., Edgerton, E., Baxter, I., Naven, L.M., Ritchie, J., Bell, G. and Murray, K. (1993b), "Where should a public access health information system be sited?", *Interacting with Computers*, Vol. 5 No. 4, pp. 413-21.

Julia Schofield Consultants (JSC) (2003), *History*, available at: www.jsc.co.uk (accessed 3 January).

Knowsley (2000), *There's More to This Kiosk than Meets the I(T)*, Knowsley Metropolitan Borough, media release, available at: www.knowsley.gov.uk/media/2000/10/2000_10_26_n0.html (accessed 13 February 2003).

Mendelsohn, F. (2001), *KISS*, available at: www.kiosksbusiness.com/SeptOct01/articles/dept1.html (accessed 17 December 2002).

Neoproducts (2003a), *Welcome to Neo*, available at: www.neoproducts.co.uk/home.asp (accessed 10 January).

Neoproducts (2003b), *Employment & Neoproducts Scoop Major Award*, available at: www.neoproducts.co.uk/profile-employ.asp and www.neoproducts.co.uk/employ/jobcentres_project (accessed 10 January).

Neoproducts (2003c), *Anite for Nuneaton and Bedworth Borough Council*, available at: www.neoproducts.co.uk/profile-anite.asp (accessed 10 January).

Neoproducts (2003d), *Wellpoint*, available at: www.neoproducts.co.uk/profile-wellpoint.asp (accessed 10 January).

Neoproducts (2003e) *Dumas*, available at: www.neoproducts.co.uk/profile-dumas.asp (accessed 10 January).

NHS Direct (2001), *Final Report on NHS Direct Kiosks,* December, NHS Direct, Department of Health, Hedge End.

NHS Direct (2002), *Health Information for Black and Minority Ethnic Groups,* report of a Consultation Workshop held by the National Electronic Library for Health and NHS Direct Online, 5 March, NHS Direct, Department of Health, Hedge End.

Nicholas, D., Williams, P. and Huntington, P. (2000), "Digital health information: case study: the information kiosk", *Aslib Proceedings: New Information Perspectives,* Vol. 52 No. 9, pp. 315-30.

Nicholas, D., Huntington, P., Williams, P. and Chahal, P. (2001), "Determinants of health kiosk use and usefulness: case study of a kiosk which serves a multi-cultural population", *Libri,* Vol. 51, pp. 102-13.

Patient Info (2003), *Patient Information for Consent System,* available at: www.picsystem.com and www.picsystem.com/pages/lit3.htm (accessed 12 February).

Payne, I. (2002), *New Web site for Homeless People in London,* available at: www.homelesslondon.org.uk (accessed 10 January).

Pearson, J., Jones, R., Cawsey, A., McGregor, S., Barret, A., Gilmour, H., Atkinson, J. and McEwen, J. (1999), "The accessibility of information systems for patients: use of touch-screen information systems by 345 patients with cancer in Scotland", *American Medical Informatics Association Annual Symposium 1999: Session 66 – Consumer Health Informatics II,* available at: www.amia.org/pubs/symposia/D005289.htm

Scream (2003), *Portfolio – Touch-screen Kiosks/Services,* available at: www.scream.co.uk/portfolio_touchscreenkiosks.shtml (accessed 13 February).

Sheffield Public DataWeb (2003), available at: europa.eu.int/information_society/eeurope/egovconf/projects_selected/uk/index_en.ht (accessed 3 January).

SYCOP (2003), available at: www.sycop.gov.uk/./scripts/menu.asp (accessed 8 January).

Technology Active Solutions (1995), *Monitoring the System,* Technology Active Solutions (confidential, personal communication, February 2003).

Technology Active Solutions (2003a), available at: www.technology-active-solutions.co.uk/touchtech.html (accessed 14 January).

Technology Active Solutions (2003b), available at: www.technology-active-solutions.co.uk/design.html (accessed 14 January).

(The) UK Parliament (2003), *Examples of "Social Pharmacy" in the New NHS,* available at: www.parliament.the-stationery-office.co.uk/pa/cm200001/cmselect/cmhealth/30/30ap54.htm (accessed 11 February).

Wilmes, B., Vogel, M. and Bennet, G. (2003), *Web-/Kiosk-based Health Information on Falls Delivered to Older People in Tower Hamlets Communities,* available at: www.smd.qmul.ac.uk/hcop/research/falls.htm (accessed 14 February).

Making health information accessible to patients

Ray Jones

The author

Ray Jones is Director of Research, Institute of Health Studies, University of Plymouth, Plymouth, UK.
E-mail: ray.jones@plymouth.ac.uk

Keywords

Internet, Information, Health education,
National Health Service, Patients, United Kingdom

Abstract

Many NHS policy documents state the need to make health information accessible to all. Accessibility comprises physical availability and personal retrievability. Touch-screen public access kiosks have been available since the early 1990s and there is some evidence from a study of NHS Direct kiosks that they could improve physical access to health information. Most health centres have little space for longer use of computers by patients. Eventually home access to the Internet will be available to most people. In the meantime, computers based in public libraries offer potential to provide health information for patients referred by their GP. However, more thought is needed as to the format and content of the information. Information tailored using the patient's medical record is preferred by patients and may enable patients to engage more social support. More evidence is needed from well-designed studies to inform the debate.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · pp. 334-338
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310498905

Introduction

Equal access to health information for patients and their families is a global issue but also important between different groups within richer countries such as the USA and the UK (Mandl *et al.*, 1998; Servaes and Heinderyckx, 2002; Brodie *et al.* 2000; Hughes *et al.*, 2002). The idea of accessibility to health information has two components: physical availability and personal retrievability.

Physical availability

Physical availability can be through publicly available, socially available or privately available sources of information. Examples of publicly available sources of information are a cancer caring centre, public library providing Internet access, or a newspaper or magazine widely distributed. Although a source is publicly available, it may still have a cost (for example, to buy or to travel to use). A socially available source is information available through someone else, via a significant other, family members, neighbour, or colleague who may have access to the Internet. Finally, privately available information is through, for example, TV at home, Internet at home or work, telephone advice line at home.

Personal retrievability

Personal retrievability is whether or not the person has the money, time, skill, knowledge, mobility, understanding, and emotional strength to make use of a particular source of information. This depends on the complexity of different information sources or the relevance of the information presented.

Social support

Social support may affect both physical availability and personal retrievability. Instrumental and informational support can affect physical availability, i.e. someone can offer the use of their computer or can drive someone to a library to let them use one there. Informational and emotional support can affect personal retrievability by helping someone to understand the information they have or by emotionally supporting them to ask questions or go to find out about something.

Information use

Information use (i.e. the number and type of sources of information that a patient or family members will access) will depend on their perceived need for information (patients who do not want information will not seek it) and perceived accessibility.

Satisfaction with information

Satisfaction with information received will depend on whether there was sufficient use to meet the need, modified by the perceived appropriateness of the information obtained, but also by their expectations and personality. For example, we found that breast cancer patients expected more information than prostate cancer patients and that patients who scored highly on a depression scale were more likely to be dissatisfied with the health information they had received (Jones *et al.*, 1999).

This paper illustrates some different ways in which accessibility can be improved. These range from improving physical availability through touch-screen kiosks to tailoring information to the individual, thus making it more relevant, less overwhelming and more likely to engage the social support of other family members.

Touch-screen kiosks

One approach to tackling the physical availability of computer-based information is to locate touch-screen kiosks or booths in community settings. Healthpoint was a community-based touch-screen health information kiosk for the public. The first Healthpoint was developed and evaluated in a health centre in Glasgow in 1989 (Jones and McLachlan, 1990). A subsequent study in 1992-1993 used a variety of evaluation methods including: automatic monitoring by the computer, interviews with users and non-users, postal questionnaires, a random telephone survey, and observation of users (Jones *et al.*, 1993a, b). Healthpoint kiosks were sited in supermarkets, shopping centres, community pharmacies, health centres, hospitals, bars, sports centres, post offices, job centres, and libraries amongst the 23 sites tried (Plate 1). There were few problems in finding sites for the kiosks. A random telephone survey of 231 people in 1992 found that 17 per cent of respondents had used one or more of ten kiosks sited in Clydebank for a five-month period. The prevalence of users amongst the over-50s (13 per cent) was not much less than the 20 per cent of users aged under 50 (whereas the difference in level of current use of the Internet by age is much greater). Interview data showed a more positive reaction from the "less educated" than the educated and was expected because of the style of presentation. In a subsequent study in one sports centre in 1996, we found that 9 per cent of people who had used the kiosk had apparently had no other form of health information in the previous two weeks (Naven *et al.*, 1996).

Plate 1 Healthpoint in use in a Glasgow shopping centre in 1991

Other touch-screen health kiosks have been developed, including a commercially available system called InTouch with Health[1] and an Anglo-Spanish system focusing on medications and aimed at community pharmacies[2]. To improve access to both health information and health services in the UK, the UK Government established NHS Direct in 1998. The main channel of communication has been a single point of entry, telephone helpline operating through 22 NHS Direct call centres. Last year NHS Direct received around 12 million calls and this is expected to rise to 18 million in the current year. In addition, the NHS Direct Online Web site[3] offers a wide range of health information including access to local contacts and links to other sites. The Web site currently has around 250,000 visitors a month. To improve equality of access, NHS Direct installed touch-screen kiosks between

September 2000 and October 2001 in 136 locations, including NHS "walk-in centres", community centres, retail pharmacists, hospitals, public libraries and retail sites. The information provided was similar to that on the NHS Direct Web site.

A study in the summer and autumn of 2001 assessed whether NHS Direct touch-screen kiosks can increase access to health information (Jones, 2001). Routine usage data were collected from 136 NHS Direct kiosks and postal and interview surveys were carried out for a purposive subsample of 20 kiosks. Kiosks had been sited in supermarkets, libraries, retail pharmacies, leisure centres, community centres as well as NHS sites. Kiosks were used on average 12 times per day but many kiosks could have been better sited. A third of those visiting sites had noticed the kiosk and 6 per cent had used it. Two-thirds would use it in the future. Four out of five aged under 30 had access to the Internet compared with only 24 per cent over 60. A quarter had obtained health information from the Internet, 36 per cent had not used the Internet for health information nor would they use the kiosk, but 39 per cent who had not used the Internet would use a kiosk now that they knew it was there. Sites such as supermarkets and leisure centres which are visited frequently by people aged over 60 would be most likely to reach those who do not use the Internet for health information. Other studies have shown the importance of siting kiosks appropriately (Jones *et al.* 1993b; Nicholas *et al.*, 2002) and more work was needed on finding good sites for these NHS Direct kiosks and making sure that people are aware of them. However, the study provided some evidence that kiosks can increase accessibility of health information.

Access to computer-based information for particular patient groups

There are many patient groups where information and education are part of the treatment. For example, we developed a multimedia system for cognitive behavioural therapy in the management of anxiety (White *et al.*, 2000). In a pilot study 29 patients had booked appointments to meet a research assistant and use a computer in a health centre. Finding space to site the computer was difficult and it was kept on a trolley and taken to an empty room by the research assistant for each appointment. Most of the patients showed good improvements in anxiety over six months. However, we needed to demonstrate its effectiveness in routine practice in primary care.

To address the problem of location for the computer we explored sites for the computers in both health centres and public libraries in Glasgow. We were able to site only one computer in a health centre but were able to site computers in most public libraries (Plates 2 and 3). In a randomised trial, GPs referred patients to be recruited by the project at ten public libraries and one health centre. Of 239 patients referred by their GP, 178 (74 per cent) were recruited to the study, the majority attending at a public library. This demonstrated that public libraries could be used as a referral destination for patients requiring information-based "treatment". Virtually all the UK's public libraries now offer Internet access and a trial of their use in urban centres would be worthwhile.

Plate 2 Multimedia touchscreen booth being used in a Glasgow public library

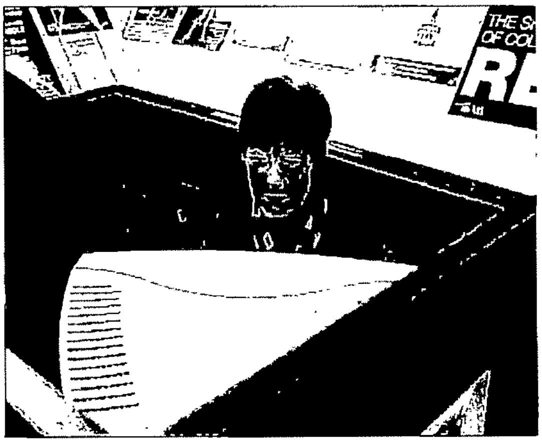


Plate 3 Multimedia touchscreen booth being used in a Glasgow public library

The difficulty of relying on just one location for a computer system was illustrated in a randomised trial of personalised computer-based education vs. CPN education for patients with schizophrenia (Jones *et al.*, 2001). In this study a touch-screen computer was sited in a Day Centre in the Gorbals Glasgow for use by patients with schizophrenia. Patients recruited to the study were allocated to use the computer for five sessions, to see a community psychiatric nurse (CPN) for five sessions, or to have a combination of one session with the CPN, three with the computer, then another with the CPN. The main aim of the educational package was to improve knowledge about schizophrenia without worsening mental state or insight. We expected the computer option to be cheaper than the CPN. No major differences were found in knowledge, insight, or mental state over three months between computer and CPN. One third of those in the "combination" group preferred the computer. However, the computer was no cheaper, as patients had to be collected and taken to use the day centre-based computer by the research assistant to ensure attendance. We modelled the costs of other options. A cheaper option would be to spend more capital on providing a number of out-patient clinics with suitable computers, so that use of the computer could be combined with other visits, such as for a monthly "depot" injection.

Tailored information

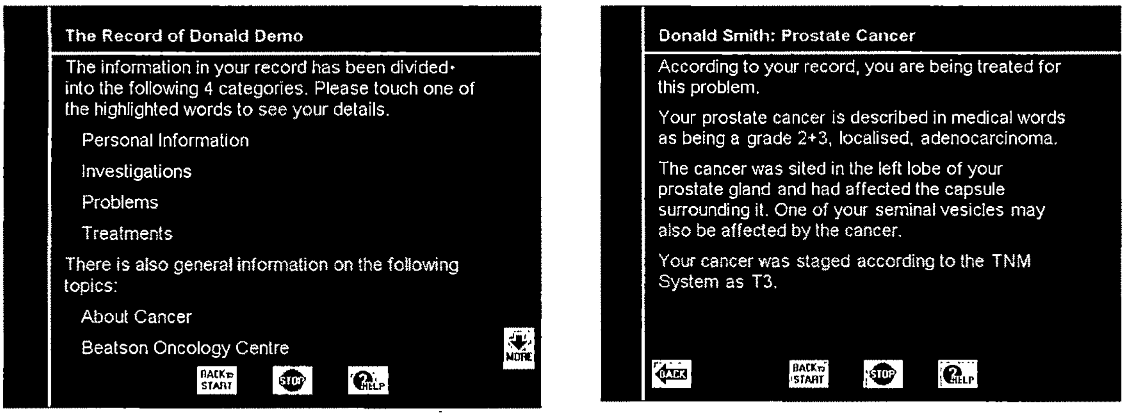
As the volume of health information increases, accessibility starts to be compromised, as patients become overwhelmed with irrelevant information. We tested the hypothesis that information tailored to the individual will be "better" than more general information (Jones *et al.*, 1999). A total of 525 patients attending a Glasgow hospital for radiotherapy were recruited. They were randomised either to use a computer offering information based on their medical record, or general information about cancer (such as they would see on a quality Web site), or to be offered a full range of booklets. (Figure 1 shows examples of "medical record" screens.) We provided both interactive access to information (at a special booth at the hospital) and computer print-outs of the information explored. We measured patient satisfaction, use and reuse of the computer, and cost. Patients who had tailored information were more satisfied with the information and more likely to show the printed copy to their family.

Social support

Some previous authors had claimed that giving cancer patients access to their own medical records might increase anxiety, so we measured it over the three months of the study. We expected no difference but surprisingly found that patients with general information showed less improvement in anxiety than those with information based on the medical record. We hypothesised that this may be due to patients with personalised information being more likely to discuss the information at home. We have just completed the data collection in a randomised trial to explore that hypothesis, focusing mainly on the paper format[4]. (A paper leaflet has the advantage that it is a resource that may be shown and discussed with family and friends. Internet access is often isolating.)

We have recruited 400 patients and their "significant others" to the study. Data

Figure 1 Examples of screens in "personalised systems"



The Record of Donald Demo

The information in your record has been divided into the following 4 categories. Please touch one of the highlighted words to see your details.

Personal Information

Investigations

Problems

Treatments

There is also general information on the following topics:

About Cancer

Beatson Oncology Centre

Donald Smith: Prostate Cancer

According to your record, you are being treated for this problem.

Your prostate cancer is described in medical words as being a grade 2+3, localised, adenocarcinoma.

The cancer was sited in the left lobe of your prostate gland and had affected the capsule surrounding it. One of your seminal vesicles may also be affected by the cancer.

Your cancer was staged according to the TNM System as T3.

collection is finished but we have yet to complete the analysis. Our focus is on how different approaches to leaflet provision impacts first on the social interactions encouraged, and second on levels of anxiety. First, we will model use of booklets in the home as a function of whether:

- patients chose the information themselves or if it was chosen for them;
- it included personal information from their own medical record or not; and
- it included advice on the management of anxiety.

Second, we will model anxiety at three months as a function of these three factors and patients' use of leaflets in the home. Our hypothesis is that personalised information is more likely to be shared with the "significant other" and that sharing information will help reduce any anxiety experienced for both.

Conclusions

Many NHS and other policy documents state the need to make health information accessible to all and there have been a number of initiatives (both by NHS and in the context of funded research) to achieve this. However, the concept of accessibility has rarely been defined. Being able to access health information via the Internet at home is not the only measure of accessibility. We may be able to access computers via kiosks, at the public library or in health centres. However, physical access is not sufficient and more thought is needed as to the format and content of the information and the social context in which it is used. In all cases we need more evidence from well designed studies to inform the debate.

Notes

1 www.intouchwithhealth.co.uk
2 http://dis.sema.es/projects/TESEMED
3 www.nhsdirect.nhs.uk
4 www.cee.hw.ac.uk/~diana/paccit/index.htm

References

Brodie, M., Flournoy, R.E., Altman, I.E., Blendon, R.J., Benson, J.M. and Rosenbaum, M.D. (2000), "Health information, the Internet, and the Digital Divide", *Health Affairs*, Vol. 19, November/December, pp. 255-65.

Hughes, K., Bellis, M. and Tocque, K. (2002), *Public Health and Information and Communication Technologies: Tackling Health and Digital Inequalities in the Information Age*, Liverpool John Moores University, Liverpool.

Jones, R.B. (2001), *Evaluation of NHS Direct kiosk*. Final Report to NHS Direct, University of Glasgow, Glasgow.

Jones, R.B. and McLachlan, K. (1990), "HEALTHPOINT: a public access health information system", in Richards, B. (Ed.), *Current Perspectives in Health Computing*, BJHC Books, Weybridge, Surrey, pp. 65-9.

Jones, R.B., Navin, L.M. and Murray, K.J. (1993a), "Use of a community-based touch-screen public-access health information system", *Health Bulletin*, Vol. 51 No. 1, pp. 34-42.

Jones, R.B., Edgerton, E., Baxter, I., Naven, L.M., Ritchie, J., Bell, G. and Murray, K. (1993b), "Where should a public access health information system be sited?", *Interacting with Computers*, Vol. 5 No. 4, pp. 413-21.

Jones, R., Atkinson, J.M., Coia, D.A., Paterson, L., Morton, A.R., McKenna, K., Craig, N., Morrison, J. and Gilmour, W.H. (2001), "Randomised trial of computer-based education for patients with schizophrenia", *British Medical Journal*, Vol. 322, pp. 835-40.

Jones, R., Pearson, J., McGregor, S., Cawsey, A., Barrett, A., Atkinson, J.M., Craig, N., Gilmour, W.H. and McEwen, J. (1999), "Randomised trial of personalised computer-based information for cancer patients", *British Medical Journal*, Vol. 319, pp. 1241-7.

Mandl, K.D., Katz, S.B. and Kohane, I.S. (1998), "Social equity and access to the World Wide Web and e-mail: implications for design and implementation of medical applications", *Proceedings AMIA Annual Symposium*, Hanley and Belfus, Philadelphia, PA, pp. 215-19.

Naven, L., Jones, R., Kohli, H. and Crawford, J. (1996), "How should we evaluate a public-access health information system?", in Richards, B. (Ed.), *Current Perspectives in Health Computing 1990*, BJHC Books, Weybridge, pp. 557-62.

Nicholas, D., Huntington, P. and Williams, P. (2002), "The impact of location on the use of information systems: case study – health information kiosks", *Journal of Documentation*, Vol. 58 No. 3, pp. 284-301.

Servaes, J. and Heinderyckx, F. (2002), "The 'new' ICTs environment in Europe: closing or widening the gap?", *Telematics and Informatics*, Vol. 19 No. 2, pp. 91-115.

White, J., Jones, R. and McGarry, E. (2000), "Cognitive behavioural computer therapy for the anxiety disorders: a pilot study", *Journal of Mental Health*, Vol. 9 No. 5, pp. 505-16.

Further reading

Jones, R., Pearson, J., McGregor, S., Cawsey, A., Barrett, A., Atkinson, J.M., Gilmour, W.H. and McEwen, J. (1999), "Cross-sectional survey of patients' satisfaction with information about cancer", *British Medical Journal*, Vol. 319, pp. 1247-8.

The potential for using hospital bedside TV services in England to provide patients with access to health information

Gavin McWhirter

The author

Gavin McWhirter is a Consultant, Factor V, Hove, UK.
E-mail: gavin@factorv.co.uk

Keywords

Hospitals, Television, Information, Patients, Health education, United Kingdom

Abstract

This article is a summary of a report which looks at the potential of using television sets at hospital bedsides to provide patients with access to health information. The report was jointly commissioned by The Department of Health (DoH) and National Health Service (NHS) Direct Online, and focused on what could be done using existing (or planned) Patient Power infrastructure. The latest generation of systems from all three of the main suppliers of bedside television service could provide access to health information in a variety of ways. A group meeting was held with key internal DoH and NHS stakeholders. Interviews were held with the main suppliers of bedside television services. Opinions were also taken from several academics specialising in Health Informatics, from a range of commercial health information providers and a wide range of NHS Trust representatives. Two areas where further research would be of use are looking at the opportunities around digital radio as a way of providing patients with health information, and looking at any particular issues that exist around communication with patients while they are in hospital.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · pp. 339-345
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310498914

Introduction

Bedside TV and telephone systems are currently being installed in hospital Trusts throughout England under a programme titled Patient Power, managed by NHS Estates. These services are currently being deployed only in hospitals with 150 or more beds on one site, representing 255 hospitals, totalling approximately 130,000 beds. There are two categories of organisation that have been issued with Patient Power licences by NHS Estates: full licence holders and provisional licence holders.

Full licence holders have demonstrated their ability to produce and maintain a patient television and telephone service. There are four organisations that hold full licences, and all are competing with one another to secure contracts with Trusts to provide their bedside television and telephone services. The suppliers have to bear the cost of installing and maintaining the systems, and can then generate revenue (and in time, they hope, profit) from patients paying to watch television and make telephone calls. There is no cost to the NHS for the provision of the basic entertainment services.

The systems being installed are there primarily to provide a bedside entertainment system for patients, with direct access to television and a telephone. The same infrastructure could be used for a wide range of additional purposes, such as providing electronic access to patient records, or access to clinical decision support software, as well as having the potential for providing patients with access to high quality health information, which was the focus of this report.

Patientline has been operating television and telephone services longer than any of the other suppliers. Hospital Telephone Services (HTS) and Wandsworth Electrical also have a number of sites that are now operational. The fourth full licence holder, Kerfone, is operational in one hospital.

Provisional licence holders need to demonstrate to NHS Estates their ability to produce and maintain a Patient Power service in one Trust before they can extend that service to other hospitals. Three of the provisional licence holders are working with Trusts to demonstrate that capability (Sodexho, Premier Managed Payphones, and Patientpal).

There are a number of areas where televisions and telephones at the bedside may not be installed. It does vary in different Trusts and on the recommendations made by suppliers (such as beds dedicated to dialysis, treatment of the very elderly, intensive care, and areas for the treatment of mental health patients).

It is thought that sites with fewer than 150 beds are unlikely to be economically viable under the terms of the Model Concession Agreement prepared by NHS Estates (a copy of the Model Concession Agreement is available at: www.nhsestates.gov.uk/download/patient_power/agreed_terms_conditions.doc).

Health information content options

There are a number of ways in which health information could be provided to patients at the bedside using the bedside television infrastructure. The options are fairly wide-ranging, and no comment is made here regarding the economic viability of the different methods of distributing information. The study merely looked at what was possible using the infrastructure that is being installed. This was based on the feedback provided through the interviews with those supplying the information, those using the existing services and those who aspire to be the content providers on these new systems:

(1) A Health information television channel could be created running a wide range of health programmes, most likely across the spectrum of health subjects. As most people are only in hospitals for a few days, it would not have to provide new programmes every day, but it could be run with a high repeat ratio. There are a number of scheduling options for a service like this. This could lead on to the provision of a more widely available extended version for viewing as a digital television channel available at home.

(2) A number of separate subject-specific health information channels could be created (e.g. Care of the elderly, Cancer, Maternity services, etc). Each "channel" could consist of a few hours of TV programming that would run on a continual loop (see section on "Bounty", p. 342). All the channels could be available to all patients, or certain channels could be made available only to beds or wards where the content is more likely to be relevant.

(3) Clips of videos or specific health information television programmes could be made available "on-demand". Individual pieces of video could be played when specifically requested by an individual patient. If this were to consist of more than just a few short videos that are played sequentially, then a navigation system would be required to enable people to find the information for which they are looking. Depending on the uptake of this service, the systems could encounter bandwidth or contention issues. The cost of deploying such a service would be relatively high.

(4) Patients are given access to a range of articles and leaflets as text that can be read on the television screen. The navigation would be in every respect like a Web site and could provide links to hundreds of pages of content. This content could be stored on a computer server locally in the hospital or link out to the Internet (or be a mix of the two).

(5) A hybrid of (3) and (4) above, providing access to a mixture of text and video.

(6) The health information service could be provided as an audio-on-demand service. So instead of (or as an alternative to) providing long articles for people to read, you provide a facility that reads the article to the patient. This could be as streamed audio or via the telephone (so along side each article a telephone number could be listed).

(7) A health information radio service could be created. This could be through a locally delivered service, possibly created by providing resources, content or other support to the many hospital radio services, or as a national health information radio station. A national health information service could be distributed via digital television and made available both in hospitals and to home listeners. Radio has a number of advantages in that it is available in hospitals of all sizes (and so not reliant on the bedside TV infrastructure), it is low-tech and universally understood, it is low effort (you can listen with your eyes closed) and it is generally taken for granted that there will be a radio service

in hospital. It could act as a "sustaining" service for local hospital radio stations. The bedside TV infrastructure will enhance access to radio services, and those patients will also have direct access at the bedside to a telephone enabling them to participate and contribute to the radio programmes. It would be considerably less expensive to create and run than a television service and could be more effective.

All of these are options that exist when considering the provision of health information to patients at the hospital bedside via the television and telephone infrastructure being put in place. There are cost implications associated with each of the various options described, in terms both of content costs, plus additional local infrastructure costs for some options (particularly (2), (3) and (5)) and service management costs imposed by the bedside TV licence holder. They may also seek compensation, if it can be shown that the introduction of clinical services reduces patient demand for paid-for services.

The source of health information content

There is a great deal of duplication of effort in the creation of content for existing patient health information resources. The majority of existing resources are put into the creation of patient leaflets, which may then be made available via the Trust Web site and intranet. The text for these leaflets is sourced from a range of places, including NHS Direct Online, the Trust's own resources (producing leaflets authored by their own health specialists, communications people, PAL service, research or library resource), or through a relationship with a commercial health information provider.

Efforts that have been made to try and reduce this duplication include the provision of resources such as NHS Direct Online. This content is available without cost for Trusts to use within their own Web sites or intranets, and can also be incorporated into patient leaflets. Despite content being available without cost, uptake of information resources like this does not appear to be so high.

The reason for the low level of uptake and use of central information resources is likely to be a combination of factors:

- Awareness of its existence may be low. It is certainly true that some commercial information providers are much more proactive in marketing their services to individual Trusts.
- The lack of a single person within each Trust with responsibility for patient health information may have also hindered the communication process. The introduction of a PALs service should improve this (although co-ordination of the financial resources required for patient information is not held by any one department within a Trust, so in order to create a patient health information leaflet money has to be "found" from a variety of different pots).
- Regardless of the source of the content for any patient information service, management time is still required to co-ordinate the process.

For a price, private sector organisations will provide a managed service that is tailored to the specific information needs of that Trust, thus reducing the management resource required. A Trust, or individuals within the Trust, may not agree with the style of content from central resources such as NHS Direct Online; a private sector information provider will help to adapt content to suit local requirements, while also taking responsibility for any liability risks associated with the provision of information.

It is explicit within the NHS Plan that patient choice in the provision of health care should be extended, so it would seem logical that patients might expect also to have a choice of different health information sources. The television infrastructure will be a powerful tool, if clinicians of all sorts and all grades support the ability of patients to access health information at the bedside. If it saves the clinician time, then they will recommend that a patient use the system to obtain information. If it then helps patients to better understand what is going on around them, it is a win-win situation.

In addition to the interactive television trials funded by the DoH between 2000 and 2002 (a service that will roll out nationally in 2004), three other health information television services already exist in the UK:

(1) *Bounty*. A direct marketing and sampling company that has specialised in the

provision of information and product samples for expectant and new mothers. They reach 95 per cent of expectant parents and 97 per cent of all new mums with their information guides and packs of free samples. The company produces a wide range of health information guides for parents, and for health professionals, including a range of videos for midwives and parent educators, which have recently been updated. Bounty has been discussing making part of this updated video material available only in maternity units of hospitals via bedside TV services. This would be offered to patients as a separate television channel, repeating the same programme content several times each day.

(2) *QTV Rotherham.* QTV is a non-commercial service that is funded by the local Primary Care Trust and has been operational for six years, providing a health information television service to local people and patients in the Rotherham area through a network of GP waiting areas, out-patient surgery waiting areas, hospital waiting areas, pharmacies and some specialist libraries. There are now around 50 sites that show a 30-minute video in these public places (all in the Rotherham area). Content is made up of short programmes or features (usually four to seven minutes long, but sometimes less than a minute).

(3) *Channel Health Direct.* This is a commercial television service available in the waiting-rooms of 1,200 GP practices in the UK. Several hours of television programming is shown in each GP practice on a continual loop, with updated material delivered via installed satellite equipment every few days.

Electronic health information providers

There are millions of health-based or related Web sites, and hundreds of respectable health information providers, varying in quality from the brilliant to the absurd. (Absurd example: www.curecancer.com, where you will find the causes of all cancers explained, and details of how to cure them as well.) Robert Kiley provides a number of absurd examples in an article "Quackery on the Web" (Kiley, 2000).

A number of organisations have commercial relationships with one part or other of the NHS, while others are funded by the NHS or other publicly funded bodies. For example:

- InTouch with Health (www.surgerydoor.co.uk) operate a suite of commercially funded patient information services, available via touch-screen kiosks and the Internet, and have an existing relationship with 64 Trusts in the UK (in 170 sites).
- Medic Direct (www.medicdirect.co.uk) is a commercial company, with content provided by over 90 NHS teaching hospital consultants and GPs.
- EQUIP – Electronic Quality Information for Patients (www.equip.nhs.uk) acts as a quality filter for patients looking for health information on the Internet by signposting them towards "good quality" sources of information, including those of the relevant patient support groups on a range of health topics. It is funded by the Public Health department in the West Midlands.

The Internet

All the main providers of the various bedside television systems are able to provide access to the Internet via their later generation bedside TV systems. As of September 2002 only one hospital (High Wycombe) was a "live" example of an Internet service, although other sites have since become operational.

By the year 2005 the vast majority of the installed bedside television systems will enable patients to access content from the Internet. The efficiency of the systems for doing this is not known. In most cases the systems intend to use slim versions of a Microsoft Internet browser, and there are significant differences between the ways in which the different systems will process data to be displayed on the browser. In some cases this may mean that a search of just a few Web sites could be a relatively slow process.

Speed of access could be enhanced by developing versions of content specifically for the different systems and browsers in use. This could also include agreements with the Trust or bedside television service provider for content to be cached locally at each hospital site, particularly for any rich media such as video, audio or graphics. Some Trusts have expressed concern about patients having uncontrolled access to the Internet from their hospitals beds, particularly young or vulnerable people. Others take the view that they have no right to restrict what people are able to see. The option exists to offer access only to specific "approved" Web sites, or indeed only to an intranet (described as a "walled garden" of content in TV parlance). The other option would be to put some form of "nanny" software on to the system that would block access to undesirable Web sites (such as those that include pornography). All the main three suppliers intend to make use of slim versions of Microsoft browsers for Internet use and for navigating locally held information content. It will be possible to stream media (audio and video).

Television

Text that is to be viewed on a normal television must be displayed very carefully, especially as people viewing television at home can sit as much as ten to 15 feet away from the screen. Small text is difficult to display clearly and at that distance cannot be read anyway. In contrast, the TV service for hospital patients is really a slim-line computer monitor that is connected to a computer network. The screen is likely to be viewed at a distance equal to the length of the patient's arm (at a similar distance to that at which someone sitting at a desk would view a computer screen). The television equipment being installed is mounted on a flexible arm that is fixed to the wall or ceiling, that can easily be moved closer or to a comfortable viewing position, or out of the way when not in use. Lack of space is a key factor, and a major reason why a flat screen technology has been deployed. Some of the operators intend to provide touch-screen units.

There is an interesting shift in perception that occurs, once it is realised that the bedside TV services are actually computer monitors operating on a local computer network – rather than just as televisions. The television signals are distributed to each bedside through a network of cables. Although the design or architecture of each system is different (for each of the different licence holders), in all cases the infrastructure being installed is in effect a local computer network. The software (middleware) that is available on a television set-top box that one might have at home to receive Sky or Cable TV is used to interpret the interactive date, but this is not available on the bedside television systems. It is, therefore, not possible to access the interactive services offered by existing digital television providers (although some do provide access to some tele-text-type services).

None of the first generation services provides direct access to the Internet (some provide a jack-point, where a laptop or other device with a modem can be plugged in to use the telephone line). All the latest generation of units from the main three licence holders provides access to the Internet. There may be contention issues (i.e. restrictions on the number of people who can access information at the same time without the "network" slowing down). None of the systems will allow patients to download material (so e-mails will not be able to have attachments). There will be firewalls in place to prevent this.

Content in the "hospital information" section of bedside TV services

The structure and content within a hospital information section depend on the enthusiasm of the implementation team, and the priorities of the Trust. In a limited number of Trusts, one or more videos about the hospital are available (e.g. in Southampton, where the bedside TV service supplier is Patientline, a number of videos are available via the system).

Once a patient has logged on to the Patientline system, an introduction video from Patientline is played to them, followed by an introductory video from the hospital – if there is one; otherwise text about the hospital can be displayed. Medical information or content can be seen as a problem because of the need for it to reflect the policy of that Trust, or the views of the senior clinicians in that field from that Trust. In most cases, at the moment, that initial plan is to provide just basic information about the hospital and the services provided, in text form. Like a Web site, this could be a single page or be menu-driven. Quite a number of Trusts are interested in electronic menu-ordering systems and a lesser number have been looking at the options for using the system for patient surveys.

HTS have been looking at a medical Web site that could feature as a sub-section of the hospital information channel, providing health information. This site features a substantial amount of video material. The intention would be for the video content to be cached locally within the hospital, but for text to be accessed via the Internet (the name of that content provider was not available at the time of the interview).

Patientline research in 2000 indicated that patients want to have access to information about their condition, as it rated over and above access to television or movies.

Other potential uses for the bedside TV systems

Access to pharmacy services was discussed by all the suppliers, in particular the ordering of tests, obtaining test results and some form of electronic prescribing. One supplier also discussed the potential for the integration of a pharmacy service with a system that makes checks on potential conflicts with other medication being taken by that patient. Also of interest is the ability to use the bedside TV service to access some form of clinical decision support software.

Northwick Park Hospital has been looking at using the infrastructure to introduce a new security scheme. The idea is to have a unit in the hospital reception. Visitors would enter the patient's telephone extension number and a photograph of that visitor would be sent to that patient, who could say yes or no to their being allowed on to the ward.

All of the systems can be used in conjunction with smart cards, that could be used as a micro-payment system for other services (to pay for things from shops or commercial service providers within or local to the hospital).

Another area of interest is the management of admissions through the bedside TV system, as well as patient discharge from hospital (which would lead to more efficient bed management throughout the hospital).

All the systems provide free access to a number of radio channels, including the local hospital radio station. Some also provide access to talking books. These can be accessed like a radio channel, with a number of set starting-times each day. One service provider mentioned that they provide access to a number of games, but admitted take-up was relatively low.

Surveys

All the suppliers said that their systems could be used for patient surveys. Wandsworth indicated that there had been little interest in this functionality at this stage, with the priority being to get core services operational. Patientline reported that their first generation system is already used for patient surveys and that their latest system has enhanced survey capability and the first such system to be used for this purpose will go live shortly. The system could be used for "national" surveys, if supported by the local Trusts.

Electronic health records

The digital systems of all three suppliers are capable of providing access to information that is held electronically. Security is a vitally important issue in this area, and one that all the suppliers claim to have resolved. There are three uses. First, where the clinician will take control of the screen and use it to check something, but not share the view with the patient. Second, where the view of information on screen is shared between the patient and the clinician. Third, where patients have access to some part of their own health record.

A number of Trusts discussed their desire to be able to use the bedside TV systems to provide patients with access to information in different languages. Others talked about using the service as part of the Trust's informed consent procedure, potentially providing access to X-rays (although it is recognised that the resolution and definition are not suitable for diagnosis), as a tool for reference and explanation to a patient.

There is also the potential for using the service for health promotion purposes, such as the provision of rehabilitation material for patients who have suffered a heart attack, or for providing new mums with details about breast-feeding, or showing people suitable post-operative exercises. Personal reminders could be issued to remind individuals when they need to take medication or of recommended exercise routines.

Conclusion

There is potential to use the bedside TV infrastructure being installed in hospitals to provide patients with access to health information. In what form it will be made available will be influenced by a combination of who is paying for the content, who is providing the content and the economic model that has been established for the commercial operators of the infrastructure. Their priority is to maximise the revenue they receive from each bed.

The DoH will deploy an interactive health information service on the main digital TV platforms (cable, satellite and terrestrial) in 2004. Although it would be logical to look to this service to be extended on to bedside television in hospitals, this is unlikely to be possible. More likely is it that the bedside TV service will provide patients with access to the Internet.

Currently the content for any information services provided on the bedside TV service is agreed at a local level by the Trust concerned, but for this medium it is likely that decisions will be led by the infrastructure supplier, who may have preferred supplier arrangements in place. What is not clear is what sort of appetite patients have for consuming and absorbing health information while in a hospital bed, and what difference it makes if the information is provided in text, audio or video form. One might assume that video content had the greatest potential to be engaging and to clearly convey messages and information, but the cost is much higher. Radio services are an integral part of the new infrastructure, but rarely mentioned. When discussed with a number of Trusts, the consensus was that patients took it for granted that there would be access to radio while in their hospital bed. This led to the thought that radio might be a more effective and efficient way of providing people with access to health information than text or using videos.

Areas that would be suitable for further research

- What are the effects of patients having direct access to comprehensive and high quality health information at the hospital bedside on their relationship with medical professionals in the hospital?
- Are patients receptive to health information when they are already in a hospital bed?
- Does an informed hospital patient require more individual consultation time with clinicians or less time?
- By providing patients with access to a bedside television service, and the Internet, are individuals more likely to make use of other electronic or online services elsewhere in the future?
- What is the most effective way of providing patients with health information using the bedside TV infrastructure?
- What is the potential for using radio as a channel for the provision of high quality health information for patients (via the bedside TV infrastructure)?
- Should the NHS be a producer and "publisher" of health information, or act as a provider of advice and guidance on the best sources of high quality information?

Reference

Kiley, R. (2000), "Quackery on the Web", Health *Information on the Internet*, No. 15, p. 9, available at: www.rsm.ac.uk/hii/toc15.htm (accessed 29 May 2003).

Further reading

McWhirter, G. (2002), *The Potential for Using Bedside TV Services (in England) as a Patient Communication Channel for the Provision of High Quality Health Information*, Department of Health, London.

Digital interactive television: health information platform of the future?

Barrie Gunter, David Nicholas, Paul Huntington and Peter Williams

The authors

Barrie Gunter is Professor of Journalism Studies, Department of Journalism, University of Sheffield, Sheffield, UK. E-mail: b.gunter@sheffield.ac.uk
David Nicholas is Professor of Information Science and **Paul Huntington** and **Peter Williams** are Research Fellows, all at the Centre for Information Behaviour and the Evaluation of Research (CIBER), Department of Information Science, City University, London, UK. E-mail: www.soi.city.ac.uk/organisation/is/research/ciber/

Keywords

Interactive devices, Television, Health education, Information, Forecasting, User studies

Abstract

Presents research that was designed to explore the early take-up of a pilot digital interactive television (DiTV) health information service (Living Health) by cable television subscribers in Birmingham, UK. Log data indicated real-time viewing behaviour of subscribers to the cable network on which the digital health service was carried. A survey of users delivered a return sample of 723 subscribers. Log data indicated an initial surge in use that subsided and stabilised at a lower level. Over one third of cable network subscribers visited the digital health TV site at least once during a 20-week pilot period. The most popularly visited pages concerned sex-related information. In the user survey, just under one in four respondents had reportedly used the DiTV service. The user profile was oriented towards older men and young adult women. Over eight in ten users found the service easy to use and understand. Over half of users consulted the service in connection with a GP visit. Some evidence emerged that use of DiTV might substitute for consulting a doctor among some users.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · pp. 346-356
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310498923

Introduction

In the UK, Gisela Stuart, the (then) Parliamentary Under-Secretary of State for Health, announced in June 2000 that the Department of Health would fund a series of pilot projects exploring possible health applications of digital interactive television (DiTV). The aim of these projects was to provide patients with easy and fast access at home to health advice and information.

This launch of NHS Digital, a development under the NHS Direct initiative, represented a further stage in the Government's commitment to provide faster and more easily accessible information about health, illness and the NHS, so that people are better able to care for themselves and their families. While the Internet has so far been the primary conduit for provision of "online" health information, the need to reach demographic groups in society who have not yet signed up to cyberspace, another older technology has entered the frame. Television is the most ubiquitous mass medium and has evolved technologically in recent years to the point where it may become an alternative interactive medium to the PC-based Internet.

The 1997 White Paper, *The New NHS* (Department of Health, 1997), identified the Internet and digital television as key media through which public access to the NHS could be improved. It was envisaged that new interactive communications media could empower patients to take more care of their own health as well as improving the efficiency of health provision in the UK.

In this exciting new world of modern interactive communications technology, digital television has been regarded as having greater potential than the Internet because television is already a well-established medium. Nearly every household in the UK has at least one TV set and, despite the relative success of supermarket online shopping, more people feel comfortable using TV than the Internet. Fewer people are likely to be excluded from a service that is available via television than from one that can only be accessed via a computer. More people may be persuaded to engage with interactive information services with the more familiar TV remote control than with a PC mouse.

The Department of Health contracted four consortia to experiment with a variety of interactive services through which registered users can access large banks of health information via their TV sets. Users were able to navigate this online health encyclopaedia using a standard digital TV remote control of the kind typically issued to new digital satellite, cable or broadband subscribers. In addition to largely text-based information services, the pilots included a number of transactional services. These allowed viewer-users to make appointments with their doctor or with specialised health services, volunteer their own services to community health support groups, maintain online medical records, or obtain a live video link to an online NHS nurse, who appears on their TV screen, while talking to them over the telephone.

While studies have emerged of the use of online health information services provided through the Internet (Eysenbach and Kohler, 2001; Pennbridge *et al.*, 1999; Quintana *et al.*, 2001), the current research was the first to examine the provision of such information via interactive television. This paper will focus on the Living Health service that was the first of the four to launch and to complete its pilot run between June and December 2001. The analysis reported here focuses on use of the text-based information service provided by this channel.

The Living Health service

Living Health offered two types of service: Interactive and Transactional. The Interactive Service was a content database on a wide range of health topics and issues. The Transactional Services comprised video access via the TV set to an NHS Direct nurse called up over the telephone and a facility to book appointments with a local GP.

Most of the text remained unchanged throughout the duration of the pilot. Updated content was provided on Health News (updated daily), Medicines Directory, Local Services Directory (updated monthly), and Public Health Alerts (notified by Birmingham Area Health Authority).

The general text-based interactive service was officially launched, along with the GP appointments booking service, on 28 June 2001. The In-Vision Service was initially rolled out across Birmingham cable hubs from 30 July 2001, but the official launch of this service did not take place until 3 September 2001.

Methodology

Research on all DiTV consortia adopted a multi-method approach that included digital log analysis of real-time user behaviour, supplemented by *ad hoc* self-completion surveys and in-depth interviews to gauge users' reactions to the services. This paper will focus on the results from the log analyses and a survey of viewer-users of Living Health. This pilot yielded the most comprehensive data on users of the four consortia.

Log analysis

Digital log data were supplied in electronic form by Living Health. These DiTV logs were relatively refined and accurate and compared favourably in these respects with Web logs. A major problem in analysing log data is that of "caching". Pages viewed on DiTV were cached, as typically are Internet pages uploaded to the end-user's PC. "Caching" is an Internet browser feature switched on at the user's machine and means that pages, once viewed, are available from the terminal being used. Thus, any pages re-viewed do not have to be downloaded again from the server, saving considerable time.

In respect of recording user behaviour via logs, however, this practice creates a problem. "Views" of previously seen pages are made from the cache and are therefore not recorded by the server access log file. The requested cable DiTV pages used in this study were routed through hubs that were then sent on to the user's TV set. Once a page had been requested, the hub cached the page and made it available to other users on the hub without re-requesting the page from the original server. Again, this resulted in an under-reporting of pages viewed. Fortunately, Living Health employed a method to obviate the effects of caching. The process was defeated by the inclusion of a non-cacheable "gif". The idea here was that each page included an image that cannot be cached by the hub and so requests are made to the server every time and a page count recorded.

Despite initial pessimism over provision of user identification data, individual subscribers could be identified via the log data supplied, but in this context "subscriber" referred to a household rather than to an individual person. Hence, "user", in the sense employed here, may refer to a family of users.

Log data enabled the measurement of overall numbers of users, and changes in these numbers over the pilot period. Usage data could be displayed in terms of the raw number of users using the service per day, the reach, and return visitor (and the numbers of users making return visits). Further measures included the length of time spent tuned in to the service and the number of pages or screens viewed during a visit. These data could be further broken down by topics viewed. Hence, it was possible to ascertain if some parts of the service were more heavily used than others. Log data were analysed over a period of 20 weeks running from the end of June to November 2001.

Users' perceptions of the DiTV service

A questionnaire survey was distributed with Living Health promotional material to 38,000 Telewest cable subscribers in Birmingham, halfway through the pilot period. In all, 723 usable questionnaires were returned (2 per cent of the population of Telewest cable subscribers in this area).

The questionnaire was designed primarily to obtain responses on the use and non-use of digital television for health information, but it also asked respondents to rank the importance of a variety of other health information sources, including health professionals, people known to the respondent, health literature, mass media and other online media (e.g. telephone help-lines, the Internet). Respondents were asked to rate the health benefits of the Living Health service, especially with regard to whether it had helped them to understand a particular health condition better or helped them in their dealings with their doctor. Respondents were asked if they found the interactive service easy to follow and to rate the comprehensibility of the information supplied. Ratings were also obtained of the perceived importance of the health topics covered by the service. Personal details were obtained from respondents about their sex, age, occupation and whether they have responsibility for the health of another person.

More females (53 per cent) than males (46 per cent) replied to this survey. There was a good age spread among respondents, with those aged 36-45 (24 per cent) and 26-35 (22 per cent) being most likely to respond.

Results

Daily use of health information on TV

The actual number of logged Living Health viewers varied quite considerably over the survey period. The text information service was launched on 28 June 2001. Just after the launch of the channel it stood at just under 400 users a day. On 3 August, the service was hit by technical delivery problems that restricted service to just two of its four server hubs that delivered the information locally. The service resumed fully on 23 August. The number of users remained at approximately 320 users a day, for the month of September. The number of users then fell after 24 September and reached a low of 200 on 9 October. From the beginning of October, the number of daily users remained in the band between 220 to 270 until the pilot period ended. The reason for the relatively sharp fall towards the end of November is unknown.

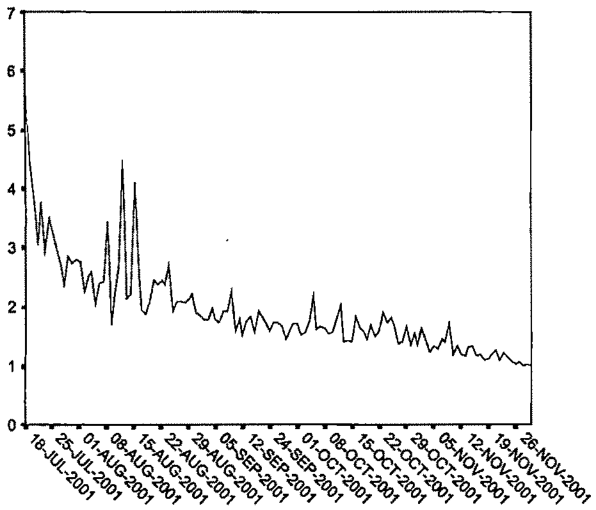
Use at the beginning of the pilot period (up to 14 July 2001) stood at approximately 14,000 page views a day. From September, use fluctuated within the range between 7,300 to 7,800 daily page views. There was, however, a sharp and as yet unexplained decline in use in the last week of November.

Return visitors

Repeat visits to a site constitute conscious and directed use and a possible indicator of site appeal. A service with a high percentage of returnees can be regarded as having a "brand" following, which is what all service providers aspire to achieve. All this makes "return visits" a powerful performance indicator. It seems logical that the more times a user returns to the site, the more likely they are to be satisfied with the site. Nearly six in ten (59 per cent) users visited the service just once in the survey period, with four in ten (41 per cent) visiting the service more than once.

Further analysis showed that those users who visited the site early after its launch were more likely to be repeat users. Looking at Figure 1, it can be seen that users who first visited the service in July/August on average visited the channel three times during the remainder of the pilot period or about once a month. In looking at just those users who had visited twice, the average number of days between the first and second visit was calculated at 26 days – and also suggested a

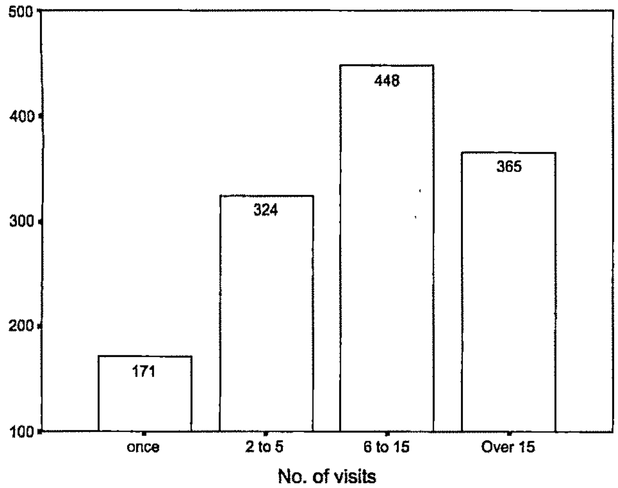
Figure 1 Number of times users visited digital health TV by date of first visit



return visit pattern of approximately once a month.

Generally, as the number of visits increased, so did the time spent viewing (during a session), although session length was shorter again for those users who visited the site over 15 times in the period of study. Figure 2 shows the session duration by the grouped number of times users had visited. Users who had visited once only had the shortest session time of approximately two minutes, while users visiting six to 15 times recorded the longest session durations of about seven and half minutes. Those who visited the service over 15 times had a shorter average session time of approximately six minutes.

Figure 2 Number of times users visited digital health TV by estimate of (median) session length



Reach

Most people are unlikely to check health information, even through a convenient online source, every day or even every week, unless they have a special reason for doing so. It is more likely that health information seeking will be conducted on an *ad hoc* basis. Average rates of site visits represent one type of metric that indicates the impact a digital health site has had upon a market. Given the likely pattern of behaviour associated with such services, however, it is important to know how many potential viewers or users have tuned in at some point or another. This information is provided by the reach metric.

The Living Health DiTV service was available to between 35,000 to 40,000 potential users over the duration of the pilot. These were households that subscribed to the cable TV network over which the service was carried. The subscriber figure fluctuated over time, reflecting the constant churn (i.e. loss of existing subscribers) and recruitment of new subscribers. Log data indicated that between 34 per cent and 39 per cent of potential users accessed the service during the pilot period. Projecting this figure to the overall cable network population, it was estimated that, during the 20-week period monitored, 13,718 different visitors (i.e. subscribing households) used the system.

Depth of visit

This measurement was indicated by page view durations, session durations and numbers of pages viewed per session (see Table I). Using Huber's robust M-estimator, the average page view time was about 13 seconds, session time was just over four minutes and the number of pages viewed in a session was about 15.

The numbers of pages viewed is an important metric in that it indicates service penetration. The deeper into the service users are prepared to search, the more involved they

Table I Average page view time, session duration and number of pages viewed per session

	Page view time (secs)	Session time (secs)	Number of pages in a session
Mean	16.84	421.11	23.62
Median	12.00	248.00	13.00
5 per cent trimmed mean	14.19	350.74	19.15
Huber's M-estimator	12.60	278.69	14.63

become. However, there is a further characteristic of the configuration of the DiTV health service that adds further meaning to this measure. The arrangement of the health information was hierarchical. Users were required to navigate menu screens before they reached actual information pages. Menu information might occupy the first two or three pages clicked on. It is important therefore to examine carefully data on numbers of pages viewed in the light of the type of information different pages contained.

Over one in five (22 per cent) users of Living Health viewed one to three pages. These users were unlikely to have penetrated past the menu screens and would not have viewed an information page. A large proportion of users (78 per cent) navigated to an information page (by penetrating beyond the third page) and over one in three (37 per cent) showed considerable interest by viewing more than 20 pages on a visit. These figures proved to be fairly stable over time.

Figure 3 presents data for median session durations in seconds by grouped number of pages viewed. As expected, the more pages users scanned, the longer was the duration of their sessions. Hence, users who looked at 21 or more pages in a session had viewing duration of approximately ten minutes and users who looked at between one and three pages conducted sessions that lasted only around 30 seconds.

Figure 4 presents page view time by the grouped number of pages viewed. Users viewing between one and ten pages had a page view time of approximately 14 seconds, but this fell to an estimated nine seconds per page for users viewing over 21 pages. Users who looked at more pages were more likely to be repeat users and were likely to quickly navigate through the menu pages.

Figure 3 Session duration (median) by number of pages viewed

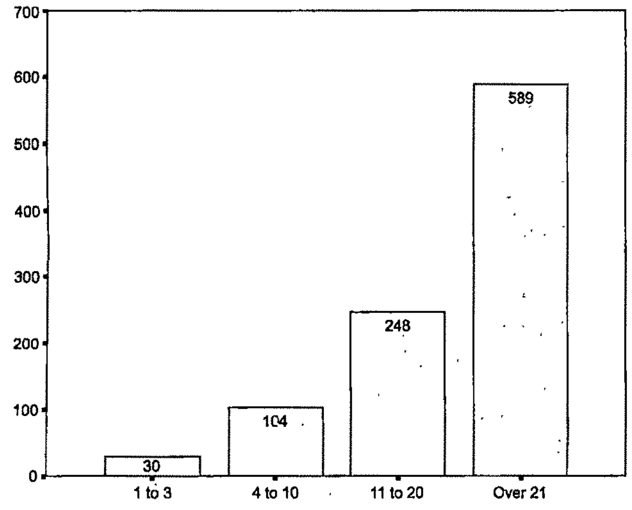
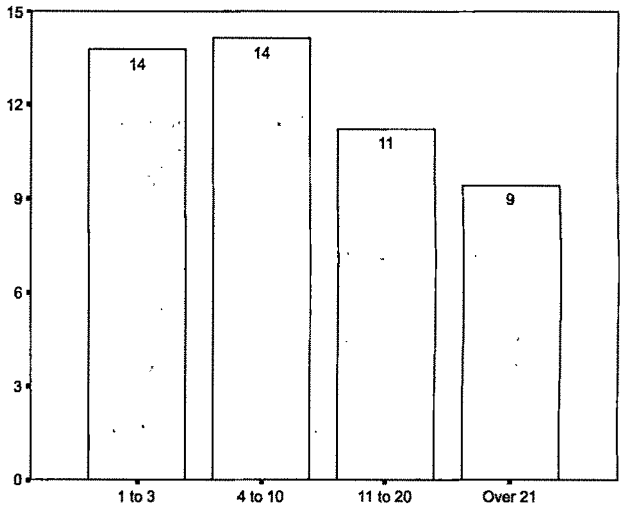


Figure 4 Page view time by the number of pages viewed



Topics viewed

To reiterate the layout of this service, Living Health's home page on DiTV offered users eight topic categories: Today's Health News, Healthy Living, Men's Health, Women's Health, Children's Health, Illness and Treatment, Local Health Services, and NHS Direct InVision. The first seven categories offered routes through to underlying textual information on a wide range of health topics. The Local Health Services section also opened a gateway to the GP appointments booking service and contained information about working in the NHS especially targeted at NHS personnel or potential employees. NHS Direct InVision was the live, transactional video nurse service.

Figure 5 shows the health topics people chose to view. Illness and Treatment was the most popular topic by some margin, with nearly four in ten users (39 per cent) viewing these pages. This perhaps points to the direct and practical application of digital health information on DiTV.

Figure 6 shows the average page view time by section. The longest page view time (median) was recorded for the Preview section and LHAppBookings (the doctor's surgery bookings service). This section recorded approximately two and half times the average page view time: 28 seconds compared with 13 seconds. The other sections recorded very similar viewing times.

Figure 5 Health topics viewed

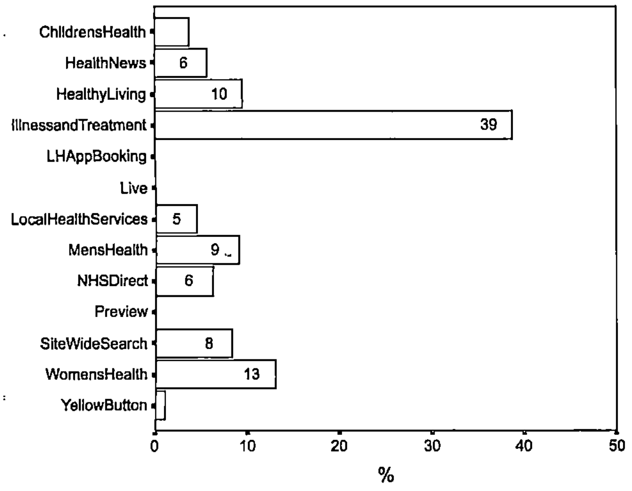
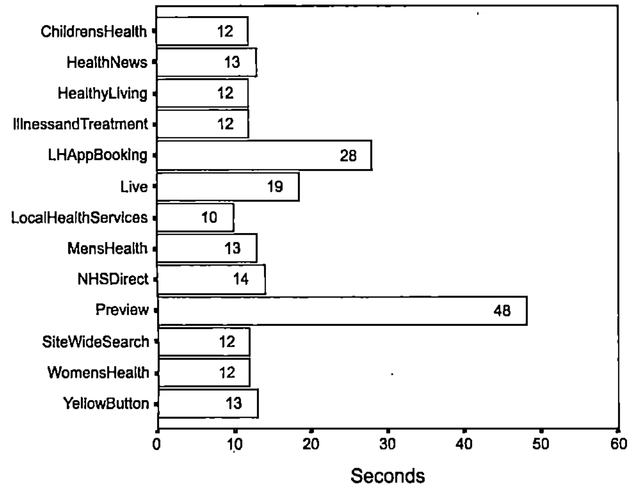


Figure 6 Average page view time by topic



DiTV users showed a marked interest in sexually related health topics. The most watched pages on Living Health were dominated by content about sex and sexual problems. These included a range of specifically men's and women's problems and other issues associated with sexual orientation:

- orgasm problems;
- impotence;
- premature ejaculation;
- keep your sex life in good shape;
- no content;
- NHS Direct InVision;
- dyspareunia;
- sexual infections;
- gay sex;
- sexual health help;
- thrush and cystitis;
- preventing prostate cancer;
- flatulence;
- practising safer sex; and
- injury treatment principles.

The above topics accounted for 7.9 per cent of all information pages, and number of unique pages viewed was 2,798.

User survey

A clear majority of respondents (72 per cent) claimed to have heard of Living Health. Fewer than one in four (23 per cent) claimed to have used the service. Among users of the service, there were more women (57 per cent) than men (43 per cent). Users exhibited an older rather than younger age profile. Three in ten users (30 per cent) were aged over 55, over four in ten (43 per cent) were aged 36-55, one in five (19 per cent) was aged 26-35, and under one in ten (8 per cent) was aged 25 or under.

While users comprised a higher percentage of women than men, this pattern changed with age. Men were in the majority among the 56-65s (61 per cent) and the 66-75s (92 per cent). Women users were in the largest majority among the 26-35s (81 per cent) and the 16-25s (69 per cent). These gender and age profiles may indicate a growing concern about their health among older men and an interest among young women, triggered by the presence of children.

Among users of Living Health, over eight in ten said they found the service useful (81 per cent), easy to navigate (82 per cent), and easy to understand (82 per cent) all or most of the time. Multiple logistic regression analysis was used to identify important factors that explained use of Living Health.

Predictors of use of DiTV

A multiple logistic regression model was used to consider what factors could explain differences between those respondents who said they had used Living Health (coded as zero) and those respondents who had heard of the service but not used it (coded as 1). The model offering the best fit yielded three explanatory variables: these were whether the person had reportedly used NHS Direct in the last 12 months; how important to them the Web was as a tool for medical information; and whether the user had an interest in prescription drugs. Table II summarises the results.

Table II Predictors of reported use versus non-use of Living Health

Variables in model	*N*	Log odds	SE
Have you phoned NHS Direct in the last 12 months?			
No	294		
Yes	145	0.35***	0.22
How important is the Internet or Web for medical information?			
Not at all/not very	196		
Fairly/very	243	1.44*	(0.22
An interest in prescription drugs			
Not at all/Not very	119		
Fairly/very	320	0.45**	0.26

Notes: Comparisons made between respondents who had used the service and those who had heard of it but not used it; levels of significance (Wald's Statistic): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; , I didn't know about it: coded as missing; I have used it: coded as 0 ($n = 138$); I know about it but haven't used it: coded as 1 ($n = 299$)

Respondents who had phoned NHS Direct in the last 12 months were much more likely to have used Living Health than those who had not phoned the NHS, confirming the earlier analysis.

Respondents who considered the Web important as a source for health information were more likely to have heard of Living Health and not used it compared with those who did not consider the Web as an important source. This result suggested that those using the Web for their health information needs were not switching to digital television, even though they know about the existence and availability of this alternative service. For these people, the early DiTV appears not to represent a substitute for Web-based information. Further research needs to clarify whether these are distinct new media markets and likely to remain so.

Respondents who reportedly had an interest in prescription drugs were less likely to have tuned in to this service than respondents with little or no interest in such drugs. Bi-variate analyses also indicated that respondents interested in prescription drugs were more likely to visit their doctor and more likely to be interested in information on a specific condition, both indicators of users who may be unwell. Of those who did reportedly use the Living Health service, approximately 55 per cent said they had used the service either before or after a consultation with their doctor. Hence, the significance of prescription drugs in the model may well be an indicator of those users who were unwell. Another interpretation of this finding therefore might be that respondents who were unwell were more likely to be users of the Living Health service.

DiTV and personal health issues

Respondents who had used Living Health were asked how much help the information found had been to them in their dealings with their doctor, in improving their condition, in changing their feelings towards their condition and in understanding their condition. More than one in two respondents who had reportedly used Living Health (55 per cent) said they had queried the system for information before and/or after a consultation with their doctor. A total of 49 per cent of reported service users said that it had either helped or helped a lot in dealing with their doctor. More than four in ten (45 per cent) said the DiTV information had helped them to improve their condition, more than one in three (35 per cent) said it had helped them to understand their condition, and one in three (33 per cent) said it had helped to change their feelings about their condition.

DiTV as an alternative to visiting the doctor

All respondents, whether they had reportedly used the Living Health service or not, were asked if they had used medical information that they had found from other sources as an alternative to seeing the doctor. This analysis permitted identification of the outcomes for those people using the service.

The impact of digital information provision in other parts of the health service has always been on the minds of health managers and policy makers. A total of 98 per cent of DiTV users answered this question, of whom 53 per cent confirmed that they had used information found from other sources to replace a visit to the doctor.

A logistic regression model was used to explore which factors characterised those respondents reported to be more likely to use information in this way. Significant predictors were the practice nurse, NHS Direct phone line, and reported use of the Living Health service (see Table III). Newspapers, health books and magazines, the Internet, family or friends, and leaflets in the surgery did not emerge as significant predictors.

The importance of information from the practice nurse exhibited a curvilinear relationship to using DiTV health information as an alternative to seeing the doctor. Respondents for whom the practice nurse was very important or not important were less likely than respondents who attached moderate importance to the practice nurse to use other sources of medical information instead of seeing the doctor. The finding among those who attached no importance to the practice nurse is not surprising and may indicate a group of respondents for whom the search for health information is not important at all. A different explanation is needed for respondents for whom the practice nurse is an important source of health information. With these respondents, it is possible that they prefer direct contact with health professionals.

Respondents who had used an NHS Direct phone line were more likely than those who had not to say that they would use another source of medical information as an alternative to seeing the doctor. This may therefore indicate that this telephone help service can provide a functional alternative to seeing the doctor.

The key finding for the current study was that respondents who had reportedly used the Living Health service were much more likely than non-users to say they would use other medical information sources as an alternative to seeing the doctor.

Age and whether the respondent had a health responsibility for another person were significant as explanatory variables. Respondents aged between 56 and 75 were less likely to use information from another source as an alternative to a visit to the doctor than were all younger age groups. This finding was consistent with previous research on the use of consumer health information on the Internet (Nicholas *et al.*, 2000).

Health interest was related to who uses information as a substitute for visiting their doctor. Health interest in the model was distributed over four variables – a general health interest, an interest in prescription drugs, an interest in healthy living, and an interest in alternative health. Those people very interested in healthy living were more likely to use medical information found from different sources as an alternative to going to the doctor than those very interested in alternative health and those interested in prescription drugs. Consumption of prescription drugs may be another indicator of a long-term health condition. Respondents with an interest in these drugs reported being more likely to use alternative sources of health information than to see the doctor.

Discussion

This study has indicated that DiTV can represent a viable health information platform and reach users who do not yet surf the Internet. Real-time behavioural use of this service was measured by digital log data that automatically provided an electronic recording of viewers' visits to this online health information site via their TV sets. Then, three months into the 20-week pilot project, users were surveyed for their reactions to the service.

Levels of daily use of the service fluctuated over the pilot period. After a brisk start, use dropped off (in part owing to a technical fault in data recording) and then recovered three months on. The numbers of daily users averaged in the hundreds, while available cable TV subscribers numbered in tens of thousands, but, over the duration of the pilot, it was estimated that around one-third of subscribers to this metropolitan cable network had tuned in to the digital health service at least once. Furthermore, early users were most likely subsequently to become repeat users, though average repeat usage was about one visit to the site per month. The Living Health service offered a large quantity of content on a wide range of health topics. The most frequently sought-after information, however, was that concerned with sexual problems. In this respect, DiTV differed from other online health information sources such as the Internet and touch-screen kiosks, where the most popularly searched health topics concerned heart disease, backache and asthma (Nicholas *et al.*, 2001).

Table III Predictors of use of sources of medical information as an alternative to seeing the doctor

Variable in model	*N*	Log odds ratio	SE
How important is the practice nurse for health information?			
Very important	270		
Fairly important	208	2.08***	0.22
Not very/at all	97	1.41	0.29
Have you phoned NHS Direct in the last 12 months?			
No	394		
Yes	181	1.46	0.22
As a Telewest subscriber, have you ever heard of a service called "Living Health"?			
I didn't know about it	143		
I have used it	136	1.84**	0.29
I know about it but haven't used it	296	0.96	0.23
What is your age group?			
Under 25	46		
26-35	141	0.82	0.40
36-45	156	0.72	0.40
46-55	94	0.95	0.43
56-65	77	0.41**	0.45
66-75	44	0.37**	0.50
Over 75	17	0.87	0.65
Do you currently have responsibility for the health of another?			
No	281		
Child(ren)	174	1.35	0.25
Other – family	64	0.61	0.31
Other/multi-carer	56	2.56**	0.36
How interested are you in information on health topics?			
Very interested	230		
Quite	281	0.69*	0.21
Not very/at all	64	0.37***	0.39
How interested are you in prescription drugs?			
Not very/at all	155		
Fairly important	251	1.58**	0.24
Very important	169	1.52	0.28
How interested are you in healthy living?			
Not very/at all	56		
Fairly important	250	1.81*	0.38
Very important	269	2.96***	0.41
How interested are you in alternative health?			
Not very/at all	189		
Fairly important	221	1.69**	0.24
Very important	165	2.50***	0.28

Notes: Levels of significance (Wald's Statistic): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; No: coded 0 ($n = 248$); Yes: coded 1 ($n = 327$)

While logs can provide comprehensive data on real-time behaviour, such data are purely descriptive and reveal little or nothing about the reasons for using the service. To find out more about this, users were surveyed for their reactions to Living Health. Just under one in four survey respondents reported tuning into this interactive health information service through their TV sets. These viewer-users were predominantly likely to report favourable experiences with the service in terms of its basic usability and usefulness.

Users were distinguished from non-users especially with regard to whether they had telephoned a national health help-line in the previous year, regarded the Internet as an important source of health information, and had an interest in prescription drugs. The significance of Internet use here, though, was that it predicted greater non-use of the DiTV service. This finding contrasts with earlier research that indicated the importance of compatibility between old and new technologies in technology adoption (Ettema, 1984; Dutton *et al.*, 1987; LaRose and Atkin, 1988). Adoption of telecommunications technologies, for example, was most powerfully predicted by use of other similar technologies (Reagan, 1987; Lin, 1994). The current research has indicated that DiTV does reach more elderly, lower socio-economic status and under-privileged people (in particular those with young children) compared with the Internet.

Online health information via DiTV was found to serve as a valuable alternative health information source to their doctor for many users. Digital health information on TV could be used to double-check information supplied by the doctor or in preparation for a consultation to supply questions the patient might ask the doctor while in the surgery or hospital. These findings confirm responses of online medical and health information users in the USA. Research conducted under the auspices of the Pew Internet and American Life project has shown that half of online health information users (50 per cent) claimed that Internet information led them to ask a doctor new questions or to get a second opinion from another doctor. Over one in four US Internet health information seekers (28 per cent) said that Internet information affected their decision about whether or not to visit a doctor (Fox and Rainie, 2000).

Although the return sample was small by comparison with the contact population, with well over 700 respondents, it can be regarded as robust enough to provide meaningful initial indications about the potential that DiTV may have as a health information platform. There are several findings that stand out in this regard.

First, the demographic profile of viewer-users indicated that DiTV, as an interactive technology, is likely to be used by a wide social spectrum. More significant, however, is the finding that it attracts a different profile of users from the Internet. In particular, one of the key predictors of service use was income of household, with users from low-income households comprising a prominent user group.

Second, there is a clear functionality to DiTV health information. Again the user profile indicates a strong presence of older males (55+) and young adult females. The older male profile represents the clear presence of a group who become increasingly concerned with health matters, in a gender that is normally reluctant to seek medical diagnosis when younger. This conclusion is supported by the emergence of interest in a health condition and use of prescription drugs as significant predictors of DiTV use. The young adult female profile reflects the health concerns of young women that may often be child-related. This observation is reinforced by the result that households with children up to the age of four were among the major users of DiTV health information.

Third, DiTV opens up an additional and complementary platform for health information to the Web. Even more direct evidence of this than the demographic profile of DiTV users was derived from the finding that survey respondents, for whom the Internet was an important source of medical information, were much more likely to be non-users than users of the Living Health service. For DiTV users, the Internet was seen as a relatively unimportant health information source.

Fourth, the functionality of DiTV in a health context came through from reports of the way users utilised its health content. Most users claimed that DiTV health information was consulted in connection with a doctor's appointment. Around half of these DiTV health information users said that it had helped them in their dealings with their doctor. Further evidence of the value of DiTV as a health information source came from analyses that showed that respondents who said they used other sources of medical information as an alternative to seeing their doctor were especially likely to be users of the Living Health service. In this context, DiTV health information ranked alongside consulting a practice nurse and using NHS Direct. Notably, use of the Internet did not emerge as a significant predictor of this behaviour.

The Department of Health in the UK has made a major investment in testing the potential of DiTV as a health information platform. The early indications are that this is a platform with promise. Longer-term commitment and observation will indicate how effective this technology can be in relation to a range of different health information and advisory functions and how best it can be utilised to benefit public health care and the health profession.

References

Department of Health (1997), *The New NHS. Modern, Dependable*, White Paper, Department of Health, London.

Dutton, W., Rogers, E. and Jun, U.H. (1987), "Diffusion and social impacts of personal computers", *Communication Research*, Vol. 14, pp. 219-50.

Ettema, J.S. (1984), "Three phases in the creation of information inequities: an empirical assessment of a prototype videotext system", *Journal of Broadcasting*, Vol. 28, pp. 383-95.

Eysenbach, G. and Kohler, C. (2001), "How do consumers search for and appraise health information on the World Wide Web? Qualitative study using focus groups, usability tests, and in-depth interviews", *British Medical Journal*, Vol. 324, March, pp. 573-7

Fox, S. and Rainie, L. (2000), "The online health-care revolution: how the Web helps Americans take better care of themselves", The Pew Internet & American life Project, available at: www.pewinternet.org (accessed 9 September 2002).

LaRose, R. and Atkin, D. (1988), "Satisfaction, demographic and media environment predictors of cable subscription", *Journal of Broadcasting & Electronic Media*, Vol. 32, pp. 403-13.

Lin, C.A. (1994), "Exploring potential factors for home videotext adoption", *Advances in Telematics*, Vol. 2, pp. 111-21.

Nicholas, D., Huntington, P. and Williams, P. (2000), "Digital health information provision for the consumer: analysis of the use of Web kiosk as a means of delivering health information", *Health on the Net*, 17 October, pp. 9-11.

Nicholas, D., Huntington, P., Williams, P. and Gunter, B. (2001), "Delivering consumer health information digitally: platform comparisons", *International Online Conference*, Olympia, December, Learned Information Limited, Oxford, UK, pp. 145-53.

Pennbridge, J., Moya, R. and Rodrigues, L. (1999), "Questionnaire survey of California consumers' use and rating of sources of health-care information including the Internet", *Western Journal of Medicine*, Vol. 171, pp. 302-5.

Quintana, Y., Feightner, J.W., Wathen, C.N., Sangster, L.M. and Marshall, J.N. (2001), "Preventive health information on the Internet: qualitative study of consumers' perspectives", *Canadian Family Physician*, Vol. 47, pp. 1759-65.

Reagan, J. (1987), "Classifying adopters and non-adopters of four technologies using political activity, media use and demographic variables", *Telematics and Informatics*, Vol. 4, pp. 3-16.

Public awareness of patient rights, consent forms and advance statements

Julia Dandy

The author

Julia Dandy is Senior Library Assistant, Information Resources Development, Imperial College, London, UK.
E-mail: j.dandy@imperial.ac.uk

Keywords

Patients, Human rights, Information

Abstract

The subject of this study is the availability of, and access to, information concerning individuals' end-of-life health situations. The sensitive issues surrounding this subject are considered in detail, and the restraints, primarily legal, placed upon information availability highlighted. Questionnaires and interviews were used to determine public and professional awareness of, and attitudes towards, the issues and were compared with a similar, albeit larger, survey conducted by the Department of Health. Complementary to this fieldwork, a review of current and proposed clinical policies, guidelines and legislation and of media commentary was undertaken. The study revealed much public confusion and ignorance about how people can influence the medical treatment they receive when seriously or terminally ill. The study revealed an urgent need for Government initiatives to provide more information on patient rights in relation to consent forms and advance statements.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · pp. 357-366
© MCB UP Limited
· ISSN 0001-253X
DOI 10.1108/00012530310498932

Methodology

Part of the study involved the examination of information sources related to clinical policies and guidelines, legislation and media commentary and an examination of practical strategies for the dissemination of information and the implementation of policy. The results of this are presented as an extended literature review.

A small-scale survey (the J Survey) was carried out to update results obtained in the "Omnibus" survey conducted by the Department of Health (DoH) (1996), which questioned 1,859 people across the UK using door-to-door interviews. The survey covered a wide range of health-care issues, of which advance directives/living wills formed a small component; this was concerned with the assessment of public knowledge of the forms and their implications. It provides a useful basis for comparison in terms of timescale, volume, and demographics. Since that time there has been progress in the development of policies for patient rights within health care and a growing awareness of associated issues such as advance statements. Hence the rationale for the J Survey, which attempted to assess the extent to which these policies are impacting on the public and on health professionals. In addition, the J Survey extended the range of coverage to explore respondents' attitudes to, and understanding of, patient rights in relation to particular health situations (including terminal illness).

The J Survey was devised and carried out in mid-2002; this made use of postal questionnaires. There were 81 respondents over a broad age range, including people from various professional backgrounds. Time, geographical and budgetary constraints meant that the sample was restricted to those living within the catchment area of London. The Department of Health study represents a truer picture of public knowledge in that it surveyed a larger number of individuals across England and Wales. These limitations have to be accepted in a study of this scope. Despite these disadvantages, one can assume that, as inhabitants of a major city in an affluent area of the country, people would have relatively good access to whatever information was available. Some questions were based on hypothetical scenarios in order to examine attitudes to the possible withdrawal or withholding of medical treatment in certain circumstances. In addition, evidence was collected during interviews with a number of health professionals, including doctors, within the National Health Service (NHS) and other Trusts and with several of the respondents to the J Survey. These interviews afforded valuable insights into values and attitudes – including ethical/moral/religious aspects – which informed the expressed personal judgements on issues relevant to this study.

Literature review

Consent forms

In April 2002 the Department of Health introduced consent forms that required health professionals to seek the consent of patients before administering certain treatments. These forms also allow patients to indicate which treatments they wish to refuse. The forms anticipate a number of different circumstances including situations where the individual lacks the capacity to indicate his/her wishes, in which case the health professional is advised to act in the best interests of the patient. The DoH summary guidance document for health professionals (DoH, 2001a) advises that "If the patient is not offered as much information as they reasonably need to make their decision, and in a form they can understand, their consent may not be valid." The DoH "Good Practice in Consent" Advisory Group produced an implementation guide (DoH, 2001b), which provides guidance to health-care staff, a model consent policy, consent forms and a guidance leaflet. It makes a series of detailed recommendations that health professionals should take into account when seeking consent. The Group also published additional guidance on consent covering the particular needs of children, older people and people with learning disabilities. These booklets are publicly available from their Web site or the NHS response line. The Royal College of Surgeons also recognises the rights of patients to accept or refuse specific treatments in section IV of their guidance paper "The surgeon's duty of care" (Royal College of Surgeons, 1997).

NHS Trusts are increasingly studying the law and risk management issues and developing local guidelines for consent (Rashid, 2000). One aspect of this is a greater emphasis on information provision. The guidance contained in the information booklets aims to ensure that patients are given the necessary information and opportunity for discussion in order to make an "informed choice". This is critical, since the courts can question the validity of an advance statement if this is disputed.

A study by Stapleton *et al.* (2002), which examined the use of evidence-based leaflets to promote informed choice in maternity care, found that cultural factors influenced the way in which information was disseminated and inhibited the achievement of a genuinely informed choice for patients. The evidence provided by Coulter and Dunn (2002) on the role of health professionals in the completion of consent forms by the patient indicates that sometimes there may be an element of coercion in gaining consent, and in failing to give adequate opportunity for discussion.

In circumstances where patients lack the capacity to make informed decisions at the time of treatment the situation is more complicated, as instanced in cases considered by Baldwin and Hurley (2002). The law distinguishes between those who have made their views clear when they had the capacity and those who did not. If people have not set out their views in an advance directive, the law provides that they must be treated in their best interests. Best interests are understood to incorporate the patient's wishes and feelings as well as clinical factors (BMA, 2001).

A total of 40 per cent of people in the DoH survey thought that, if they orally informed their relatives of their wishes in advance, this would result in their wishes being carried out. However, although the involvement of relatives/close friends in completing a consent form with a patient is encouraged, there is no legal basis for this belief:

> One of the most enduring myths about consent has been that relatives are empowered to give consent on behalf of incapacitated adults. There exists, however, no legal basis for this (King, in Nys (1991)).

Even when patients have made explicit their wishes in advance (in an advance statement, for example), the lack of a statutory requirement means there is a degree of uncertainty regarding the outcome, especially where medical staff are opposed on principle. This is of great concern to those who argue the case for patient autonomy. It has been argued that legal recognition should be given to a third party to ensure that medical professionals comply with the previously expressed wishes of the patients.

Advance statements (advance directives/ living wills)

The emergence of advance directives/living wills is closely related to the increasing complexity of decisions regarding medical treatment at the end of life.

Legal issues

It is important to discuss the legal background to advance statements, since court decisions help to direct health policy in the form of initiatives and clinical guidelines. A number of cases, quoted by Docker (2000), established legal precedents for the withdrawal of treatment and for living wills. One of the most prominent was the 1993 Tony Bland case[1]. Bland was in a persistent vegetative state (PVS) following the collapse of the Hillsborough Football Stadium. His parents and the hospital authority concerned had sought permission from the High Court to withdraw the artificial nutrition and hydration keeping him alive. He had not made anything that could be construed as an advance statement[1]. The Appeal Court concluded that, if Bland had made an advance statement covering non-treatment in the event of PVS, the doctors could not only lawfully comply but would be acting unlawfully if they did not. Lord Butler-Sloss said, "all counsel agreed that the right to reject treatment extends to deciding not to accept treatment in the future by way of an advance directive or 'living will'". However, an opposing view was expressed in another case considered by Docker (2000), in which an advance directive refusing treatment had been signed:

> Although a carefully worded living will may be decisive evidence in court, the choice must be clearly established and applicable in the circumstances ... Unless and until that is established in any particular case, living wills are persuasive and informative documents but lacking the full weight of the law at the time that they are needed (Docker, 2000).

In many circumstances patients will be forced to seek redress from the courts, relying on previous judgments. Even when the law is applicable to a person's situation, it may still have to be enforced through lengthy court proceedings. There is an obvious tension between the law, patients' rights, and medical ethics that can lead to legal disputes as to the validity of an advance statement. The Law Commission in 1999 reviewed the need to introduce statutory requirements for advance statements. They rejected the need to legislate – their view was that "the guidance contained in case law together with the BMA's code of practice provides sufficient clarity and flexibility" (Lord Chancellor's Department, 1999a, b). Despite reports of a Government initiative to strengthen the legality of living wills the situation remains the same.

Some doctors may also be opposed to a law that makes them vulnerable to litigation charges. There was unanimous opposition to a change in the law from all the doctors who took part in the J Survey.

However, it seems that it is only by statutory requirement that there would be any impetus for change. It would bring this issue into the public domain and place an obligation on health professionals to ensure that individuals are adequately informed of their rights, with the assurance that they will be respected. Doctors would need to be assured that appropriate legal safeguards concerning litigation would be defined.

Clinical guidelines for advance statements

Advance statements are recognised as being legally enforceable by the British Medical Association, the Royal College of Nursing, the General Medical Council, the Nursing and Midwifery Council and the Law Society. The policies of the major organisations involved are considered below.

British Medical Association (BMA)

Doctors are obliged by common law and ethical codes of practice to respect the wishes of patients who refuse treatment, including advance directives requesting that their lives are not prolonged by medical treatment, provided that the patient is competent, i.e. of sound mind, when making that choice. The BMA guidelines emphasise the need to set legally enforceable limits and strictly defined circumstances in which it would be ethically acceptable to withdraw treatment. They also recommend that health professionals examine their own values to determine whether there is a potential conflict in treating a patient whose values may be contrary to their own; patients must be informed of their doctor's own views and any objections they may have to the principle of an advance statement (BMA, 1995a).

Royal College of Surgeons
Reference has been made to the guidance paper "The surgeon's duty of care" (Royal College of Surgeons, 1997). It recommends that patients' rights to refuse treatment be respected as long as "the treatments that are rejected are clearly specified along with the clinical conditions under which they may be offered".

Royal College of Nursing
The Royal College of Nursing advises nurses against signing or drawing up a living will for a patient in case it affects its validity but recommend that they encourage patients to use one of the standard living wills available.

NHS Trusts
Little information is available from NHS Trusts about policies and guidelines for advance directives/living wills, as distinct from consent forms. In a recent study, Diggory and Judd (2000) conducted a questionnaire survey of 247 NHS Trusts of various types to enquire about their policies regarding advance directives. Some of the findings are as follows (see Table I):

- Only 30 per cent of the Trusts which responded had developed policies, and these policies varied widely in their approach, content and understanding of the legal issues. Many Trusts were aware of the problems and 187 Trusts (76 per cent) believed that national guidelines on advance directives would be useful in resolving these.
- Disturbingly, of the 70 Trusts not intending to develop policies at that time, 43 provided acute services, where a policy of advance directives is likely to be appropriate. However, 63 of these 70 Trusts (90 per cent) were among those that expressed interest in the development of national guidelines.

An increase in general information on these issues since 2000 appears to have resulted in some improvement in policy development. Booth (2003) has recently reported a significant development at Hammersmith hospital:

> [T]he Hammersmith Hospitals NHS Trust in West London will be the first in Britain to ask patients to write a "living will". These written wishes will inform future treatment decisions and override any opinions expressed by the patient's family. The trust decided to introduce the form after its study of 74 healthy elderly patients showed that, if they were dying, 94 per cent would prefer to refuse surgery, 93 per cent did not want artificial feeding, 92 per cent did not want to be placed on a ventilator and 90 per cent did not want to be resuscitated. Women were twice as likely as men not to want treatment. The Hammersmith Trust intends to hand out the forms to elderly patients who are about to leave hospital, so that they can take them home and discuss them with their families. Trained nurses will explain the implications of their choices (Booth, 2003).

Table I Policies on advance directives within NHS Trusts

Existing policy	Intending to develop policy	Not intending to develop policy	Other Trusts
37	87	70	53

Provision of information on advance statements

Groups representing patient rights
The NHS patient advisory and liaison services aim to provide a support service for patients and their families. The two main independent patient bodies are The Patients' Association and Patient Concern. Other groups providing information include Age Concern, the Voluntary Euthanasia Society (VES) and the Terrence Higgins Trust (THT).

Electronic resources
Official sources include NHS Direct, the DoH Web site, and the British Medical Association. The BMA seems to be the most accessible in terms of locating information easily. Although the content is geared towards practitioners, much of the literature is designed to have a practical application; therefore the information and advice given are clear and precise. There are numerous Internet sites but many are based in the USA (where living wills are widely accepted) and therefore not very helpful because of the differing legal position in the UK[2]. The Patient Self-Determination Act in the USA is a law requiring that all states recognise living wills and Durable Power of Health Attorney as advance directives, and that all funded institutions provide patient information documents, health-care provider training and community and patient education programmes that discuss advance directives. The BBC Web site[3] provides a sense of historical context and includes debate on some of the moral and ethical issues involved.

It also gives access to a comprehensive and authoritative range of articles. The VES[4] and the THT[5] provide a great deal of information on their Web sites, including model forms and useful legal and practical advice regarding their completion.

Format for advance statements

The BMA *Advance Statements Code of Practice* (BMA, 1995b) describes the different formats such a document may take. It can be a witnessed statement, a written document, a signed printed card, or a note of discussion recorded in a patient's notes. Clear general statements or preferences should be respected if appropriate but are not legally binding.

Docker (2000) rejected the suggestion that the term "living will" be replaced because of potential confusion with a "last will and testament". He concluded that "living wills are widely discussed in the popular press and the term is now known to most health-care workers. If it does not cause confusion to the man in the street, there is no reason why it should do so to lawyers or lawmakers."

The term "living will" is often regarded as preferable to "advance directive", because it conveys the solemnity of the document and gives it a legal flavour. However, it is also potentially misleading. In both the DoH survey and J Survey, some people understood it to mean a financial will. The legal allusion is also unhelpful in that people may be encouraged to lodge their living will with their solicitor or place it in a legal deposit box. Indeed, several people suggested that they imagined this would be the case. One of the main recommendations to the House of Lords by Docker (1983) for the Voluntary Euthanasia Society for Scotland (VESS) was the need for a standard model form or document that would be universally useful to all sectors of the population as well as fulfilling the needs of the medical and legal profession.

Practical arrangements

Case notes

Although BMA guidelines recommend that patients' views are recorded in their case notes, there is potential for mistakes arising as a result of poor communication, particularly if several specialists are involved. A few simple questions added to the hospital admission form would alert hospital staff to the existence of a directive.

Cards

The BMA has recommended that patients carry a card indicating that an advance statement has been made and where it can be found. Medical cards issued by EXIT (Scotland) and VES (England) provide another means of recording one's wishes regarding non-treatment.

Register of advance statements

A register for advance statements could be an extremely effective method of ensuring that patients' wishes are consistently recorded. A successful scheme will require a concerted effort to improve public knowledge, possibly through a nation-wide advertising scheme. Given the pressure on public health resources, this may be unrealistic.

Armbands

A scheme similar to an existing one for organ donation is offered by MedicAlert, a non-profit-making charity. They can supply a bracelet or necklace that alerts medical staff to the existence of a living will and gives details of a contact telephone number.

Electronic health records

The importance of good information, accessible when and where it is needed, is a central theme of the *NHS Plan* "Information for health: building the information core" (DoH, 1998). The creation of electronic health records is at the heart of this strategy. The perceived benefits of this are that NHS professionals will have 24-hour secure access to critical information relating to patient care. The Plan addresses the need for timely and accessible information in emergency care, where rapid decisions have to be made. Doctors and nurses are advised in emergency situations to try and establish as far as possible whether a living will/advance directive exists but clearly in an emergency situation the priority will be perceived as saving life. The Government has recently proposed the centralisation of electronic health records for country-wide access. This would be particularly useful in emergencies. However, there are serious security concerns about unauthorised access. In a later *NHS Plan* (DoH, 2000) the Government also announced its intention to give all patients access to their electronic health records by 2004: "Electronic access has the potential to significantly improve communication and accuracy of records" (Coulter and Dunn, 2002). This would have clear benefits in respect of living wills and advance directives. However, security then becomes more problematical.

Dissemination of information

Goss (2002), of Patient Concern, stressed the point that:

> ... much of the Government's efforts to improve public knowledge with regard to patient rights, specifically living wills and consent forms, has concentrated on the design and publication of leaflets rather than ensuring this information actually reaches individuals concerned.

There are several factors that will affect this: the physical location of leaflets, efforts by health professionals to make people aware of their existence and opportunities for further discussion. Because the criteria for living wills need to be exact, they involve a thorough awareness of risks, circumstances and legal position; ambiguities are likely to be settled only in the courts. The experience of the USA, which has had a longer experience of dealing with such forms, suggests that doctors require relevant information and training in communication skills in order to advise their patients well before admission to hospital.

Survey results

The questionnaires and interviews elicited many points of interest; these are summarised below.

Many of those surveyed in the J Survey had not heard of the terms consent forms and advance statements (advance directives/living wills); the results are:

- Those that correctly identified the terms as being related to medical care (79, 68 per cent in the J Survey, 438, 40 per cent in the DoH survey) had only limited knowledge of what was involved. Even allowing for the fact that some people chose the option to instruct both a doctor and a relative about their wishes for medical care, a fairly large proportion in the DoH survey (443, 40 per cent) were under the mistaken impression that they need only instruct their relatives.
- A total of 79 (63 per cent) had heard of the term living will; this compares with 992 (38 per cent) in the DoH survey, though differences in the numbers and professional status of those surveyed must be considered here and elsewhere[6].
- Fewer people were familiar with the term advance directive (79, 17 per cent, J Survey), though this was higher than that found in the DoH Survey (380, 5 per cent).
- A total of 328 (62 per cent) of people in the DoH Survey were unaware that they could influence in advance the medical care they receive.
- A total of 72 (12.5 per cent) of respondents thought that a living will dealt with financial arrangements.
- Less than 40 per cent (79) recognised that there had to be written evidence of a living will for treatment to be legally withdrawn. This was backed up by anecdotal evidence from nurses, many of whom remarked that relatives were often distressed to discover that this was needed.

Female respondents had generally higher knowledge and understanding of many aspects of the relevant issues studied than males. This is ascribed to their often greater role in healthcare, both professionally and privately.

An NHS nurse interviewed for this study (J Survey) commented that, in her varied experience, patients within physical care units were given little opportunity to discuss their treatment and there was often pressure on patients to comply. Where disagreements arose, "it depended on how articulate the patients expressed their wishes as to whether their views were taken seriously". If patients were adamant, usually the medical team would endeavour to explore alternative treatments. She commented that within mental care there was greater emphasis on patient involvement in discussion of treatments. Because they were dealing with the patients' overall psychological wellbeing, a more holistic approach was taken.

The survey indicated a growth in awareness and knowledge of the issues involved (particularly of the patient's right to refuse treatment), since the DoH survey in 1996 – though many misconceptions remain. A total of 67 per cent of those aware of living wills had gained their knowledge from the media. In some cases the term was associated (wrongly) with euthanasia.

The results of the J Survey indicated support for the larger-scale DoH survey findings that lower age groups showed more awareness of the term "living will" than the upper age group. The DoH results are:

- 25-44 year age group: 375, 42 per cent; and
- 65 years and over age group: 244, 24 per cent.

This is somewhat surprising in that one might expect that the older group of 65 years and above, the group most likely to find these matters most relevant to their situation, would show greater awareness. Media influences may be responsible. Education (e.g. in GCSE courses) is an additional factor contributing to awareness in the lower age groups.

Nearly 80 per cent of those questioned felt that information on advance directives/living wills should be made available to all adults, regardless of their age or state of health; nearly 70 per cent stated that they would consider writing one in the future. There were indications that religious beliefs were a major factor for those who disagreed. Many respondents stated that their decision to consider writing an advance statement would depend on the complexity; the process was seen as bureaucratic (i.e. it would involve approaching several different people or organisations). Most people (69, 74 per cent) felt that it would be easier if all information and forms were available from a single source, preferably GP surgeries. However, a significant number of people (69, 26 per cent) felt that information should be publicly available from a number of sources, e.g. post-offices, libraries. Although many people surveyed in this study felt that leaflets were an ideal way of increasing awareness, this had to be backed up by a support system, either through their general practitioner (GP) or through an independent consultant, to offer advice and opportunities for discussion.

All but one of the eight GPs were in favour of living wills. Opinion was divided as to whether information should be made available to all adults, with four doctors expressing agreement, the remainder being uncertain. Leaflets within surgeries were unanimously supported. Three out of the eight doctors interviewed indicated that their practice had clearly established guidelines. There was some uncertainty amongst the remainder. All except one felt that the current arrangements were unsatisfactory. One of the main concerns expressed in the questionnaires from doctors was the potential uncertainty that arises where a significant time has elapsed between drafting the will and its enactment. The other frequent concern was that people often make inaccurate predictions about the quality of life that they would be willing to accept after undergoing major surgery. A lawyer interviewed in this study said that one of the weaknesses in the current system is that in emergency situations there is no time to establish the existence of a living will. Armbands would be valuable in such circumstances.

Some questions required respondents to consider hypothetical scenarios featuring medical circumstances; in each case they were asked if they felt it would be acceptable to withdraw/withhold treatment. The results from these are interesting. Responses to such questions that attempted to assess people's views with regard to advance statements showed significant support for these statements, particularly for patients suffering extreme pain or with a terminal condition. In scenarios where the patient had suffered a stroke, was not in pain, but where quality of life was greatly affected, 73 (50 per cent) of respondents approved of assistance to die being given by medical staff (e.g. by withdrawal of treatment) on the basis of either a patient's oral request or a previously prepared living will. The number of respondents who disapproved of such action being taken in these circumstances (73, 24 per cent) was decreased to only 12 per cent if the patient had made a living will – the other 12 per cent converted to "Not sure", possibly because of lack of knowledge of living wills. In terminal cases where there was a living will, a high proportion (80 per cent) approved of termination (e.g. by withdrawal of treatment); this was increased to 74 (90 per cent) where there was extreme pain and a patient requested (or had previously requested) action for termination.

Conclusions

The study indicates that people are often confused about the terms classified as advance statements (consent forms, living wills, etc.), of how they function, and of their legal form status for effective action. Moreover, everyone interviewed said they did not know how to obtain information about them and were unaware of the practicalities of completing an advance statement. In particular, many were unsure about who should be informed.

The results provide a disturbing confirmation of the public ignorance about these matters, found three years ago, in a study by Schiff *et al.* (2000), though there is at least a growing awareness of, particularly in the younger age groups, and strong support for their availability and practical use. Patients now expect to have greater autonomy in health care, although they are unsure both of how to obtain it and of the extent of their "rights". In particular, the introduction of consent forms within the NHS is a major advance in the context of ongoing medical treatment. However, this study supports the view that more effort is needed to ensure that practical measures to provide information on consent forms to potential patients, with back-up advice, are defined and implemented. The consent form makes a brief suggestion that it may be appropriate to make use of independent advocates, i.e. health-care proxies. The role of such health-care proxies could be to provide information to patients and explore possibilities, which could then be discussed in more detail with their doctor when making decisions. It would ensure that the principles outlined in the guidelines are consistently applied by professionally trained advocates, who can give consistent and objective advice free from the personal feelings which may intrude as a result of being solely involved in their care. It would be very useful to have a similar arrangement for living wills.

The subject of advance directives/living wills poses more difficult problems. This study found that the understandable reticence to discuss issues of mortality is likely to be one of the main reasons why there is little knowledge or understanding of the subject. What is lacking is any official initiative to inform the public of their rights with regard to advance directives/living wills. This role is performed almost solely by the media through reporting of legal cases. This has possibly had the effect of improving awareness of terms, as indicated by the J Survey, but has not improved understanding for the majority of people.

The inevitable effect of this lack of knowledge appears to be a presumption amongst some health professionals that people are indifferent. It is certainly implied by the relative lack of information within the health service.

The recent survey of NHS Trusts by Diggory and Judd (2000) revealed a disturbing lack of policies on living wills/ advance directives. The policies examined showed a wide variation in approach, content and consistency in understanding of the legal issues. However, there was a high level of interest in national guidelines being developed. Clearly, national guidelines would aid the promotion and development of policies within Trusts and also of consistent approaches to the issues involved. They would also be very important in informing the wider public and the media of the legal provisions that are available.

There is a case to be made for government to take a more active approach to disseminating information, perhaps as part of patient care through surgeries. The lack of a standard form for a living will available through the NHS affects the accessibility of these agreements and is likely to influence their acceptance. A common response to the living will from interviewees to the model forms by the THT and VES was to question whether this was a "real" form, i.e. would it have any effect in an end-of-life situation. Health professionals may have insufficient time to thoroughly discuss these matters with patients. Any appropriate safeguards such as counselling and discussion will require greater resources of time and money. The suggestion by Docker (1983) that the paper work for living wills should include explanations as well as safeguards would benefit both patient and doctor. Doctors quite rightly respond to different patients in different ways, and this depends in part on their perception of a patient's ability to cope with such information. For this reason, it may be inappropriate for doctors to raise the issue with some of their patients. Leaflets within surgeries would be valuable but may well be inadequate for some.

The BMA recommends that people should lodge a copy of their advance directive/living will with their doctor and that a relative should be informed. For legal reasons it is imperative that it is lodged in their doctor's notes and is witnessed. Given that this document provides the most reliable source of evidence in a court of law, there need to be great clarity and a more systematic procedure for lodging people's directives. The Government initiative to introduce electronic records would help overcome some of the practical difficulties, particularly in emergency situations. NHS trusts are taking this issue seriously, as evidenced by the reference to advance statements in guidelines and policies for consent.

Recommendations

Much more effort needs to be put into making information about consent forms and advance statements available to patients and to the general public and into advising patients of their use and implications well before they enter hospital. More vigorous government initiatives on these matters and on developing national policy guidelines are required. GPs' surgeries are perceived to be an important potential source of information.

Much of the development of advance directives/living wills has been undertaken by organisations such as the THT and the VES, and by similar organisations in other countries. In some countries such documents have a firm legal basis. Based on the evaluation in this study of the current legal situation and on the associated survey of people's views, there appears to be a need for national incentives to review the various types of advance directive/living will with a view to formulating a standard UK version acceptable to the medical establishment and patients and national guidelines for its use. The aims should include:

- to work towards putting such documents on a firm and clear legal footing;
- to promulgate information about procedures to be followed by doctors, other medical staff and patients in completing and lodging such a document and using it as a basis for appropriate action;
- to actively promote training in such procedures for relevant medical staff and independent advisers.

Notes

1 *Airedale NHS Trust* v. *Bland* [1993], WLR 316 [1993] 1 All ER 821.
2 www.uslivingwill registry.com/internet_resources.shtm; www.mindspring.com/~scottr/will.html; www.nwjustice.org/docs/9501.html
3 www.bbc.co.uk
4 www.ves/org.uk/livingwills.html
5 /www.tht.org.uk/publications/livingwill.htm
6 Differences may be accounted for by demographical variations as well as size of the sample. The sample group for the J Survey constituted only 10 per cent in size of the DOH survey, most of the respondents being drawn from the London/SE region and consisting of a large number of professionals.

References

Baldwin, A. and Hurley, C. (2002), "Assisting death or letting die? Withdrawing treatment at the patient's request", *Nursing Critical Care*, Vol. 7 No. 5, pp. 241-6.

Booth, J. (2003), "Hospital gives elderly the chance to choose how and when they die", *The Daily Telegraph*, 23 February, available at: www.telegraph.co.uk/news (accessed 25 February).

British Medical Association (BMA) (1995a), *Advance Statements: Code of Practice*, Section 13.3, p. 6, available at: www.bma.org.uk/ap.nsf/Content/codeofpractice?OpenDocument&Highlight=2,advance,directives#objection (accessed 30 May 2003).

British Medical Association (BMA) (1995b), *Advance Statements: Code of Practice*, Section 2.1, available at: www.bma.org.uk/ap.nsf/Content/codeofpractice?OpenDocument&Highlight=2,advance,directives#definitions (accessed 30 May 2003).

British Medical Association (BMA) (2001), *Withholding and Withdrawing Life-prolonging Medical Treatment: Guidance for Decision Making*, ch. 1-3, available at: www.bmjpg.com/withwith/chapters/1_3.htm (accessed 30 May 2003).

Coulter, A. and Dunn, N. (2002), "After Bristol: putting patients at the centre", *British Medical Journal*, Vol. 324, pp. 648-51, available at: bmj.com/cgi/content/full/324/7338/648#resp1 (accessed 31 May 2003).

Department of Health (DoH) (1996), *Office of National Statistics Omnibus Survey, Study Number 3913*, Module 154, UK Data Archive, Essex.

Department of Health (DoH) (1998), "Information for health: building the information core", *NHS Plan*, Sections 3.4.1-4.1.4, p.18, PDF format, NHS Executive Policy Unit, available at: www.doh.gov.uk/ipu/whatnew/socv1.pdf (accessed 1 June 2003).

Department of Health (DoH) (2000), *The NHS Plan*, NHS Executive Policy Unit, available at: www.doh.gov.uk/about/nhsplan.htm (accessed 1 June 2003).

Department of Health (DoH) (2001a), *12 Key Points on Consent: The Law in England*, available at:

www.doh.gov.uk/consent/twelvekeypts.htm (accessed 30 May 2003).

Department of Health (DoH) (2001b), *Good Practice in Consent – Implementation Guide*, November, PDF format available at: www.doh.gov.uk/consent/implementationguide.pdf (accessed 30 May 2003).

Diggory, P. and Judd, M. (2000), "Advance directives: questionnaire survey of NHS Trusts", *British Medical Journal*, Vol. 320, pp. 24-5, available at: bmj.com/cgi/content/full/320/7226/24 (accessed 30 May 2003).

Docker, C. (1983), *Submission to the House of Lords' Select Committee on Medical Ethics*, Voluntary Euthanasia Society of Scotland (VESS), Scotland, pp. 1-23.

Docker, C. (2000), "Legal clarification on living wills", rapid response letter, *British Medical Journal*, Vol. 321, 19 October, p. 705, available at: bmj.com/cgi/eletters/321/7262/705/a#10304 (accessed 18 March 2003).

Goss, R.M. (2002), "Are they operating with your consent?", in Hancock, J. (Ed.), *The Times*, 17 September, London.

Lord Chancellor's Department (1999a), *Who Decides? The Government's Proposals for Making Decisions on behalf of Mentally Incapacitated Adults*, CM4665, HMSO, London, available at: www.lcd.gov.uk/family/mdecisions/indexfr.htm (accessed 30 May 2003).

Lord Chancellor's Department (1999b), *Lord Chancellor's Speech to the Law Society Conference on Mental Incapacity: Mental Incapacity – New Millennium, New Law?*, HMSO, London, available at: www.lcd.gov.uk/speeches/1999/10-11-99.htm (accessed 30 May 2003).

Nys, H. (Ed.) (1991), *Making Sense of Advance Directives*, Kluwer, The Netherlands, p. 95.

Rashid, C. (2000), "Philosophical implications of the use of advance statements (living wills)", *Nursing Standard*, Vol. 14 No. 25, pp. 1-8.

Royal College of Surgeons (RCS) (1997), "The surgeon's duty of care", *Senate Paper 2*, October.

Schiff, R., Rajkumar, C. and Buplitt, C. (2000), "Views of elderly people on living wills: interview study", *British Medical Journal*, Vol. 320, pp. 1640-1.

Stapleton, H., Kirkham, M. and Thomas, G. (2002), "Qualitative study of evidence-based leaflets in maternity care", *British Medical Journal*, Vol. 324, p. 639, available at: bmj.com/cgi/reprint/324/7338/639.pdf (accessed 17 March 2003).

diabCAL: evaluating computer-aided learning for diabetes patient education

Emma-Jane Berridge and A.V. Roudsari

The authors

Emma-Jane Berridge is based at the Health Care Education Development Unit, City University, London, UK.
A.V. Roudsari is Senior Lecturer, Centre for Measurement & Information in Medicine, City University, London, UK. E-mail: a.v.Roudsari@city.ac.uk

Keywords

Computer based learning, Diabetes, Patients, Health education, Function evaluation

Abstract

The design and development of a computer-aided learning tool for the education of patients with diabetes and for the training and support of practice nurses providing diabetes care have been previously reported. diabCAL is a broad and comprehensive learning tool, which can be accessed as a modular course or a desktop quick-reference. Evaluation is central to the design process and can be formative, informing design and development throughout the lifecycle, or summative, assessing the value of the finished product. diabCAL was subject to rigorous evaluation at various stages during development, including: verification of curriculum content and structure, evaluation of navigation and evaluation of system content. A final hybrid formative-summative evaluation assessed usability and acceptability of the system. Evaluations were conducted by technical experts and users, and findings of the final evaluation study, conducted by patients, confirmed that diabCAL was acceptable to most users – that is, interesting and perceived to be useful – even to those with little previous computer experience.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · pp. 367-378
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310498941

Introduction

Computer-aided learning (CAL) has been established in recent years as a useful tool (Lowe *et al.*, 2001; Devitt *et al.*, 2001; Campaign for Learning, 2000; Bauer and Huynh, 1998), and is increasingly employed in patient education (Graham *et al.*, 2000; Campbell *et al.*, 1999; Day *et al.*, 1997; Carroll *et al.*, 1996; Chambers and Frisby, 1995). Diabetes is a non-communicable chronic disease affecting increasing numbers of people, which in the UK and world-wide is a matter of growing concern. It is the focus of increasing attention, and was the subject of one of the first National Service Frameworks published by the UK Department of Health (DoH, 2001, 2003). Diabetes is a complex condition, the (self-) management of which requires significant knowledge and understanding, and (self-) monitoring of the condition requires both knowledge and technical skill. Patient education is therefore seen as the corner-stone of diabetes care. As the prevalence of diabetes increases, responsibility for the care of people with diabetes increasingly falls to primary care, and often to practice nurses; it is therefore essential that they are equipped with the knowledge, skills and support to care for increasing numbers of patients.

In order to address the problem of educating a large – and growing – population of diabetic patients about effective self-care, within the time and cost constraints of the NHS, a dual-branched, computer-aided learning system was developed. diabCAL was developed with specific branches aimed at patients, on the one hand, and practice nurses, on the other. It constitutes a novel intervention to improve patient care and self-care in two ways: by educating patients themselves and by training the practice nurses increasingly responsible for their care; in effect, allowing the NHS to "treat more patients and provide the highest quality of care" (Cook, 2000). The design and development of this computer-aided learning tool have been previously reported (Berridge *et al.*, 2000).

Emma-Jane Berridge was supported with a CASE studentship from the Economic and Social Research Council. Ethical approval for the usability evaluation involving patients was gained from St Thomas's Hospital Local Research Ethics Committee.

Evaluation is central to the design of computer-aided learning, and can be formative or summative. Formative evaluation is conducted throughout the lifecycle, informing design and development; summative evaluation assesses the value of the finished product (Sutcliffe, 1995). diabCAL was subject to rigorous evaluation at various stages during development, providing expert and user feedback to enhance the final product. A final hybrid formative-summative evaluation was conducted to ascertain the usability and acceptability of prototypical modules and system tools to real world users. This paper summarises the various evaluations conducted and their findings.

Verification of curriculum structure and content

Early in the design process, a brainstorming exercise and domain analysis were conducted to provide an understanding of the broad and complex domain of diabetes. From this process, concept maps were developed, which both mapped the domain and provided a curriculum for the learning tool. Having determined that diabCAL would be modular in structure, individual concept maps were developed for each module, and higher level maps were drawn to represent the top-level structure of the system. In order to verify that the information contained was correct and the structure sensible, these concept maps were subject to evaluation by domain experts.

During their development, verification of structure and content was obtained through consultation with members of the multidisciplinary team at St Thomas's Hospital, London, whose advice was sought at regular intervals. Specialist nurses, a dietitian and podiatrist all contributed informal feedback, which was taken into account as development of the maps progressed. In order to assess the overall organisation and content of the concept maps, upon completion they were subject to formal evaluation by another group of domain experts. This evaluation sought to verify the structure and content of the curriculum, as embodied in the collection of concept maps. The maps were sent, along with a straightforward questionnaire, to a sample of Diabetes Specialist Nurses (DSNs) and other specialist professionals involved in diabetes care from around the UK.

The questionnaire requested scored responses to the perceived completeness of the information contained in each concept map, and therefore in each module and in the higher level structure of the proposed system. These scores were on a scale from 1-6 – "incomplete" to "complete". The aim of the verification exercise was to establish to what degree domain experts agreed with the structure and content as proposed within the concept maps, as well as to elicit any further information deemed necessary for inclusion in an educational system for patients and non-specialist nurses. The ideal score for each map was therefore 6, indicating complete agreement with the map in terms of both structure and content. Where the score for a map fell below 6, the questionnaire allowed space for free text responses to the organisation, content and structure of the information. Where there was disagreement with content and structure, comments were taken into account and the concept maps modified accordingly.

Evaluators were initially approached by telephone or by letter. An individual covering letter was sent with the questionnaire and concept maps to each evaluator, explaining the aims of the project and the purpose of the evaluation.

Findings

Findings from this evaluation have been reported elsewhere (Berridge *et al.*, 2000). In summary, of the 14 modules in the patient branch of the system, 29 per cent achieved a mean score of 5.5 and above. This high degree of consensus indicated that few changes were to be made to an individual module's content and organisation. A total of 64 per cent achieved a good degree of consensus – a mean score of 5 and above – and all maps attained a mean score above 4.5. These results indicate that there is considerable agreement by health-care professionals regarding the completeness of the maps. Of the nine practice nurse maps, 44 per cent achieved a mean score of 5.5 and above, 89 per cent a score of 5 and over, and, again, all achieved a mean score of 4.5 and above.

Only two modules of the total of 23 obtained scores below 4. The score of 3 indicates that a substantial amount of work was necessary on structure and content of the module. It should be noted that these scores were decided after significant discussion of the maps between evaluator and facilitator, which was an unusual situation – each of the other evaluators had considered the maps and completed the questionnaire independently. All scores given by this evaluator tended to be lower than those given by others. It is suggested that any opportunity for discussion generates ideas and considerations that may not come to light under independent scrutiny, and that this may be a reason for the lower scores.

Each concept map was subject to consideration as a discrete entity, and yielded a discrete score, along with comments as to what was thought to be lacking, where appropriate. All evaluators' scores for each map were taken together to show an average score and to provide the "percentage of the ideal", showing to what extent the modules' organisation and structure deviated from what the polled group of experts perceived to be "ideal". Evaluators' comments for each module were also considered together to provide a picture of all the modifications deemed necessary by these experts in the creation of comprehensive and well structured modules. The concept maps were duly modified according to the domain experts' comments, many of which requested only trivial changes, or flagged the importance of including more detailed information than the high-level maps presented.

Having verified and modified the concept maps thus, development of diabCAL continued, and modules began to take shape from this skeleton built of consensus.

Navigation evaluation

The second exercise in formative evaluation involved the assessment of the navigation procedure, which was necessarily developed in the early stages of content creation. Navigation was broadly based upon Windows© conventions. Because the two are inextricably linked, navigation was designed as the interface was designed and implemented.

Evaluation of the navigation methodology was undertaken by a sample of 17 practice nurses. Participants were visited at their workplace by the investigator, with diabCAL installed on a laptop PC. Each evaluator was asked to undertake a short set of tasks, in which they were required to navigate from one specific point in the system to another; having performed these tasks, they were asked to complete a short questionnaire about their experiences.

A set of four tasks was developed. Three of these involved participants navigating through parts of the system from one specific point to another, while the fourth requested that participants seek out information of their own choice within a specified module sub-topic, which they had to reach themselves. The tasks were designed with two objectives in mind. First, tasks were designed to require the use of both the module menu and sub-topic list (see Figure 1), as well as other interaction techniques such as buttons and hypertext links, therefore forcing participants to fully exploit all the available navigation techniques (rather than rely on familiar or obvious techniques, such as the clicking of buttons). Second, the tasks were designed to take users deep into the structure of the system in order to ascertain whether they felt comfortable and well-oriented even at a relatively deep level.

While the tasks were designed to force participants to use all available navigation tools and to venture deep into the structure of the system, the questionnaire endeavoured to reveal – based on participants' experience with navigating through the system in this way – whether the navigation method employed was:

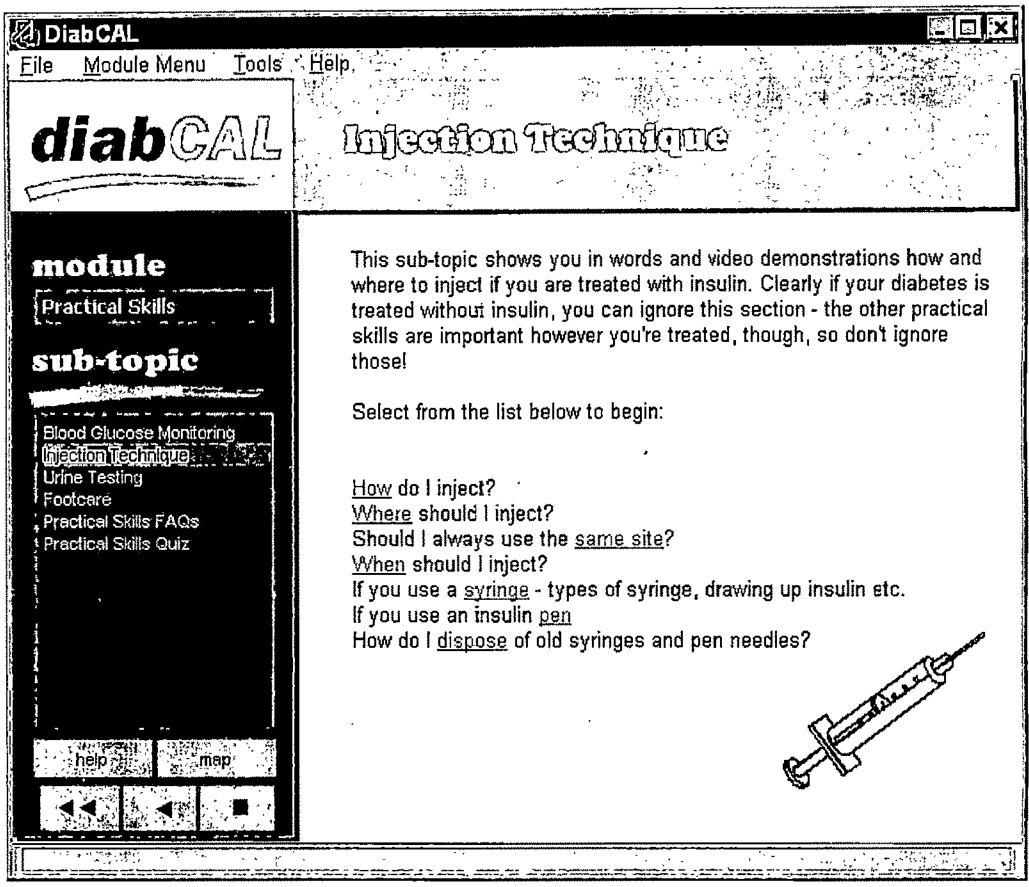
- *Meaningful*: does navigating in this way make sense?
- *Intuitive*: having read the instructions, can users navigate in this way?
- *Straightforward*: is it easy to navigate in this way?

In addition, the questionnaire sought to find out whether users: initially read the navigation instructions provided upon entering the system, whether these instructions were sufficient and sufficiently accessible, and whether the organisation of the system into modules and sub-topics – which helps dictate how navigation can proceed – was meaningful.

The questionnaire was divided into sections about:

- Navigating as a new user.
- The navigation instructions (introduction page).

Figure 1 The diabCAL user interface, with the module menu at the top of the window and the sub-topic list (with current location highlighted) on the left



This sub-topic shows you in words and video demonstrations how and where to inject if you are treated with insulin. Clearly if your diabetes is treated without insulin, you can ignore this section - the other practical skills are important however you're treated, though, so don't ignore those!

Select from the list below to begin:

How do I inject?
Where should I inject?
Should I always use the same site?
When should I inject?
If you use a syringe - types of syringe, drawing up insulin etc.
If you use an insulin pen
How do I dispose of old syringes and pen needles?

- The module – sub-topic organisation.
- The control panel.
- Computer access and confidence.

The questionnaire was designed with guidance from Oppenheim (1992) and Bowling (1997). It comprised mostly closed questions requiring a yes/no response. In some places, these questions were followed up with an open question requiring details (the "why" or "how" or "where"), or with a list of options from which one or more responses could be selected. Only one Likert-style scale was used, and this was the final question, requiring participants to respond on a five-point scale about how confident they felt using a PC.

Practice nurses already involved in diabetes care were chosen as evaluators at this stage, since they represent one section of the target audience for the learning tool under development and because a cross-section of computer literacy was expected. A certain amount of diabetes-specific knowledge was pre-supposed in order that users could be given simple cues about to where to navigate, rather than step-by-step instructions on how to navigate there; for this reason patients were not involved in evaluation at this stage.

Findings

Questionnaire results were analysed to find participants' reactions to the system. The majority found the system easy to navigate (94 per cent), and found themselves well-oriented most of the time (94 per cent). However, as many as 11 participants (65 per cent) still felt that the navigation could be improved in terms of ease of use for new users. Most popular of the proposed additions was the inclusion of a map of the system (accessible from the menu bar or from a button on the control panel), an option selected by 72 per cent ($n = 8$) of those respondents. Next most popular was the addition of a Web browser-style "forward" button (36 per cent; $n = 4$), and a further three respondents (27 per cent) felt that more internal navigation instructions, such as "Return to ... ", "Jump to ... ", etc. would be helpful. One nurse was particularly emphatic about the need for prompts of this kind to aid orientation: "I used internal navigation prompts more than I used 'back' button etc. I feel continuous prompts are essential to ease navigation from PC illiterates [*sic*]."

Although 94 per cent of users ($n = 16$) found themselves generally well-oriented most of the time, 29 per cent ($n = 5$) admitted they did find themselves lost or confused about their location on one or more occasions. Comments about location included "returning to modules", suggesting that the method of choosing modules from a menu on the menu bar was not immediately obvious for some users. However, despite initial problems encountered by some users, evaluation confirmed that the method of choosing modules from a menu bar item and selecting sub-topics from a single select list box made sense – this was found to be sensible by all users – and that the inclusion of internal navigation instructions (hypertext links directing users back to the sub-topics' main page) is useful alongside the sub-topic single select list box (82 per cent).

As anticipated, a range of computer use and confidence was found among participants, though none of the evaluators felt entirely lacking in or entirely full of confidence. A total of 12 participants (71 per cent) reported that they had a PC (running Windows) on their desk; however, for one this "depends which room I'm working in".

The findings illustrated that the deployment of multiple tools to perform the same navigational task could be useful, since different users attempt the same task in different ways. For example, one participant noted that she "got stuck on page [*sic*] which had no backward internal navigation" – that is, a page without an explicit hyperlink back to the previous page visited. The "back" button – always visible on the control panel – performed the same task but, although this was mentioned in the instructions and was available at all times some new users clearly are not aware of it. The additional internal navigation instructions (in the form of hyperlinks on the page) are a useful addition for some users.

The method of choosing modules from the "module" menu at the top of the window was not initially obvious for several users, as concurrent informal observation of users confirmed. However, this method was learnable and most users settled into selecting modules in this way; indeed, all 17 evaluators responded positively in a later question about whether it made sense "to select modules from a menu bar item".

Evaluation at this stage identified a number of modifications expected by users to ease navigation. The system was modified according to evaluation results and participants' suggestions on how navigation could be improved, with priorities based on the number of evaluators for whom a particular modification was important. Several users expressed a wish for the navigation instructions page to be accessible from the help menu at all times, as well as available on entry to the system (88 per cent). One nurse "could not find [her] way back to it", and this impacted upon her experience of using the system. As a consequence, the system was modified to include a "Help" button on the control panel – visible at all times – providing access to navigation instructions, as well as a "Help" menu on the menu bar – a familiar feature of Windows programs – providing duplicate access. Some evaluators felt that a map of the system would be a useful addition, and so an interactive tree-like map was developed, again accessible from a button on the control panel as well as from an option in the "Tools" menu. Table I summarises modifications made on the basis of evaluation results.

With these modifications a new iteration of the interface was produced: evaluation informed system design and development, contributing to the evolution of the system. In order to validate the modifications made based on users' comments, and to ensure that the navigation procedure continued to satisfy the majority of users, navigation issues were revisited in a later study.

Content evaluation

Having evaluated diabCAL's navigation procedure and implemented the suggested modifications, development of the system proceeded with the addition of textual and multimedia content. While textual content was developed with reference to various up-to-date medical texts and consensus-based sources, it was important that it should be validated by experts to ensure the accuracy and propriety of the learning material. As such, once the textual content of modules was implemented, each module was subject to evaluation by Diabetes Specialist Nurses. The

Table I Summary of modifications to aid navigation for new users, based on evaluation findings (navigation evaluation)

Modification	Number of users for whom this was a priority
Enhanced accessibility of "How to Navigate" page	88.23 per cent of all participants ($n = 16$)
Addition of a map of the system	47 per cent ($n = 16$) (72 per cent of the 11 users indicating that improvements could be made)
Elaboration of navigation instructions	29.4 per cent of all users felt the instructions were "not sufficient" ($n = 16$)

evaluation of the first two modules, What is diabetes? and Practical Skills, is reported at this stage.

In order to examine the validity of content, participants were asked to read sequential pages of textual content and score each page in terms of the accuracy, appropriateness, tone and readability of the text (see Table II), using a six-point Likert scale for each on a questionnaire administered by the investigator. Each point on the scale was discrete, and participants were asked to choose one value on each scale, where 1 represented "not at all (accurate, appropriate ... etc.)" and 6 represented "completely (accurate/appropriate ... etc.)". A six-point scale was chosen over a five-point scale in order to deter clustering around the middle value. Where evaluators disagreed with content in terms of accuracy, they were prompted verbally (though prompting was often unnecessary) to explain what they would change. This information was noted by the researcher directly on to the questionnaire. Likewise, if any other feature of the text (appropriateness, tone, readability) was scored poorly, feedback was requested if not volunteered and was again noted by the researcher.

Diabetes Specialist Nurses were chosen as evaluators at this stage, since expertise in the field was absolutely vital to ensure that content was appropriately evaluated; from a pedagogical perspective, DSNs were chosen because of their role as educators. Twenty DSNs from across London participated.

Table II Assessment criteria, content evaluation

Criterion	Definition
Correctness	Is the information conveyed accurate?
Appropriateness	Is content appropriate: to the given audience; to diabetes care; within a patient education system?
Tone	Is the tone of the text appropriate and balanced: is it supportive and unpatronising?
Readability	Is text easy to read: is the readability level appropriate; does it make sense?

Findings

The findings are presented in Tables III and IV, which express the frequency of the various mean scores achieved for correctness, appropriateness, tone and readability of content across the total number of pages of textual content in each of the two modules evaluated at this stage.

The great majority of pages were awarded high scores (scores of 5 or 6) by DSNs. As a result, there was a great clustering of mean scores at 5.25 and above. A score of 6 indicated that the evaluator was "completely" happy with content in terms of its accuracy, appropriateness, tone or readability and would therefore wish to change nothing. A mean of 6 therefore indicates consensus in satisfaction among the group of evaluators across the four completed evaluations of the module.

In terms of accuracy, as many as 26 of the total of 63 pages (41.27 per cent) in the What is Diabetes? module were deemed to be completely correct across the four evaluations, and this is reflected in the frequency of means of 6 in Table III. In the Practical Skills module (Table IV) scores again tended to cluster around the higher values (5 and 6) . However, although their frequency is low, there were more instances of much lower mean scores in the evaluation of this module. For example, three pages of content achieved mean scores of 3.5 and below, for correctness or appropriateness, indicating that at least some of the DSNs evaluating did not agree with the content included.

That the majority of pages achieved scores of 5 and 6 indicates that DSNs were happy with the accuracy, appropriateness, tone and readability of much of the content. Where unhappy, comments were provided as to how to improve or correct content. The majority of contention and variation between scores occurred in the Practical Skills module; What is Diabetes? dealt more with factual

Table III Mean scores for each feature of textual content within the What is Diabetes? module

	Number of pages with a mean score of:													Total
Text feature	**6.0**	**5.75**	**5.67**	**5.5**	**5.33**	**5.25**	**5.0**	**4.75**	**4.625**	**4.5**	**4.25**	**3.875**	**3.25**	**pages**
Correctness	26	8	1	12	0	5	3	3	1	1	2	1	0	63
Appropriateness	32	13	1	5	1	7	3	0	0	0	0	0	1	63
Tone	28	24	0	5	0	6	0	1	0	0	0	0	0	64
Readability	31	20	0	8	0	3	1	0	0	0	1	0	0	64

Table IV Mean scores for each feature of textual content within the Practical Skills module

	Number of pages with a mean score of:											Total
Text feature	**6.0**	**5.75**	**5.5**	**5.25**	**5.0**	**4.75**	**4.5**	**4.33**	**3.5**	**3.25**	**2.0**	**Pages**
Correctness	30	11	7	8	2	1	1	0	1	0	1	62
Appropriateness	45	8	3	3	0	0	1	1	0	1	0	62
Tone	37	22	2	1	0	1	0	0	0	0	0	63
Readability	37	20	3	3	0	0	0	0	0	0	0	63

information, which was therefore subject to less dispute.

As might be anticipated, some markers were harsher than others: some DSNs awarded scores as low as 1 for content with which they disagreed, while others went only as low as 3 as their least satisfied. However, all participants were happy to award scores of 6, and those who gave much lower scores when they saw flawed content were no less generous with their sixes.

We do not know if a score of a particular value meant the same thing to each evaluator (other than 6 and (probably) 1, for which explicit meanings were advised), and in some instances there was substantial variability among scores awarded between evaluators. For example, in the page "Why test urine for glucose?" within Practical Skills, scores for correctness varied from 1 to 5 (individual scores awarded were 1, 3, 5 and 5). However, comments provided (about why content was not "completely correct") varied little between nurses. In this way, the comments provided – the qualitative data collected – were invaluable, while the quantitative information collected was simply "useful" and aided the presentation of evaluation findings.

The individual scores awarded and the mean scores for each feature demonstrated the extent to which there was agreement with content across and between evaluators, and the evaluation as a whole provided expert advice on how to improve content. Having already evaluated the curriculum with system map evaluation described above, this provided a second verification of the macro content (the sub-topics and their composite pages) as well as verification of micro content (the detail forming the flesh on that skeleton). This examination of the micro content generated unique advice about emphasising certain terms or phrases, or rearranging sections to optimise the impact of what the DSNs deemed to be key messages. The evaluation had the added benefit of providing a proof-reading service, picking up typographical and spelling errors, which despite careful checking had still slipped through.

For both modules, evaluation findings indicated that the majority of nurses were generally satisfied with the content presented in terms of each of its four named features – accuracy, appropriateness, tone, and readability. Comments from participating DSNs, explaining why they were not completely satisfied where scores of less than 6 were awarded, and suggestions for appropriate or requisite modifications were taken into account in order to develop the next iteration of diabCAL.

Hybrid formative-summative evaluation: usability and user acceptance

Having subjected various aspects of the system to assessment by different groups during the course of development, and with expert and user feedback incorporated into the development process (formative evaluation), finished prototype modules were finally subject to evaluation by real-world users. Where previous evaluations of diabCAL concerned the structure, design and content of the system, this final evaluation of the two completed modules concerned usability (in greater breadth than the navigation evaluation) and broader user acceptance.

A summative study can be defined as a "study designed primarily to demonstrate the value of a mature information resource" (Friedman and Wyatt, 1997, p. 304). In the context of the current research, this might involve a large-scale assessment, requiring a longitudinal study of patients' and practice nurses' learning, conducted to assess the usefulness of the finished product from a pedagogical point of view – a study of a new educational intervention. A study of this scale fell outside the scope of this research, in which a prototypical system – a representative sub-set of the large-scale finished product – has been designed and developed. However, to assess user satisfaction with the system as it stands was within the scope of the project, collecting information on the perceived usefulness of the system, and various other measures of acceptability by users. This was really a formative-summative hybrid, acting as it did to assess satisfaction with finished modules and informing the development of subsequent modules. Indeed, Sutcliffe (1995, pp. 224-5) offers a different definition of summative evaluation:

> ... evaluation when the product exists. In this case the results of tests add more to the sum of knowledge about a product [and], if the results can also be used to improve the design, so much the better.

Sutcliffe also expresses that the boundary between the two types of evaluation does become blurred.

The evaluation conducted here defines usability in terms of some of Nielsen's Usability Attributes (Nielsen, 1993): Learnability, Error rate and User Satisfaction; and user acceptance in terms of his "social acceptability": do patients enjoy the experience of using the system, do they value the experience (Would they use it again? Would they recommend it to others?) and do they believe that in principle, upon this experience, CAL is a useful tool?

Evaluation was conducted by diabetic patients, randomly sought from those attending the Diabetes & Endocrinology Day Centre at St Thomas' Hospital, South London, over the course of six weeks. Participants were invited to spend a minimum of 30 minutes browsing diabCAL, with the researcher available to answer questions and allay any anxiety as necessary. A standardised spoken preamble preceded participants' browsing of the system. Having browsed the system, participants were asked to complete a written questionnaire, designed to address the aims of the evaluation by eliciting:

- Patients' views on the ease of use of diabCAL in general, the aesthetics and ease of use of the interface, the ease of use of the navigation, the value and accessibility of the content, and the use of various media.
- Patients' attitudes to using this system specifically to provide education about diabetes and self-care.
- Patients' attitudes to using computer-aided learning in general to provide education about diabetes and self-care.

Data collected using the questionnaire were supplemented with observation data. The researcher took observation notes as users browsed the system, with the focus on where problems were encountered or errors occurred.

Findings

A total of 11 people participated in the evaluation with a mean age of 38 years (range: 17-63). Observation data were collected for all participants. One further gentleman did commence participation, but was forced to withdraw because he simply could not manipulate the mouse. Of the eleven participants, eight were female and three male. Of the eleven completing participants two "never" used a computer and two did so only "rarely". The remaining seven used a computer "often". Six users felt "very comfortable" using a computer; however, three participants reported feeling generally uncomfortable on the PC.

Usability

In terms of how easy to use the system was found to be initially for new users, the majority reported it to be very or reasonably easy, with 27 per cent ($n = 3$) of users giving a score of 1 (very easy) and 36 per cent ($n = 4$) giving a score of 2. Three participants (27 per cent) gave a score of 3 – equating to "quite difficult" – and 1 (9 per cent) a score of 4, indicating they found it "very difficult". Where users had problems initially, comments related in some cases to the system itself and in others to users' lack of familiarity with PCs. For example, the participant who gave a score of 4 added that "the problem is understanding how to use the computer. Re-learning how to use the mouse made it easier." Another simply commented that "I'm not computer-literate." (Indeed, later in the questionnaire, this participant indicated that they "never" use a computer, and that they were "not at all comfortable" with computers.) However, in other cases, specific problems caused by the interface were to blame, for example, "the screen shot of the module menu [in the 'getting around' pages] was confusing – not sure whether to click that". This, of course, was exactly the kind of comment required, providing clear diagnosis of a specific impediment to usability.

Despite reporting that problems were encountered initially, participants were generally happier (in terms of the ease of use of the system) over the whole duration of their session. Indeed, when asked how easy to use they found the system overall, four participants (36 per cent) found the system "very easy" to use (score of 1), six participants (54 per cent) "quite easy" (score of 2), and only one user found the system "quite difficult" (score of 3). No one this time gave a score of 4 (very difficult). Four participants gave the same score for initial and general ease of use; however, five awarded a higher score (where "highest" is 1) for their general experience – thus indicating that they found the system became easier to use as their session continued. Interestingly, the one user who originally awarded a score of 4 was the only participant to move by more than one place – a leap of two places from a 4 to a 2. Comparisons of scores awarded for initial and general ease of use can be found in Table V.

In following up this question about general ease of use, when asked what made the system difficult to use in general, comments again varied from specific problems or misunderstandings ("broken links", "occasionally how to go back to previous screen wasn't obvious, although it wasn't difficult to get back there", "unsure how to get back/go on when finished navigating through a subject"); to basic difficulties engendered by users' lack of familiarity with the PC ("mouse", "I did not know how to use the computer"). Despite problems encountered, both initially and in general, all the participants reported that this did not put them off using the system.

For one participant, there was nothing that would make the system easier to use – it was fine as it stood. However, from a list of options given in the questionnaire, including:

- training: how to use a computer;
- training: how to use the system;
- clearer help files;
- someone sitting down and showing me the first time; and
- repeated/frequent use,

all other participants identified items that would help with usability. Participants could select as many options as they wished. As many as seven (64 per cent) users felt that training about how to use the system would help (despite only four – 36 per cent – reporting earlier that they found the system difficult to use initially), and six (55 per cent) felt that training about how to use a computer was important. Five (45 per cent) felt that "Someone sitting down and showing me the first time" would be useful, and five that repeated or frequent use would make the system easier to use. Only one participant felt that clearer help files (the "getting around" pages) would improve ease of use. General comments included "larger text/larger screens" and "a quick session as at the hospital today".

Navigation

In terms of navigating the system using the module menu and sub-topic lists, all users reported that this made sense. As many as four participants (36 per cent) claimed to

Table V Scores awarded for initial and general ease of use

Participant number	1	2	3	4	5	6	7	8	9	10	11
Initial usability	2	3	3	3	1	2	2	1	4	1	2
General usability	2	2	2	2	1	1	3	1	2	1	2
Change ↑/↓	–	↑	↑	↑	–	↑	↓	–	↑	–	–

Note: 1 = very easy; 4 = very difficult have "never" found themselves lost or confused about their location after a few clicks through the menu or through links (score of 4), and two "rarely" (score of 3). The remaining five found themselves lost or confused only "sometimes" (score of 2). No one was lost or confused "often".

When asked what strategies were used for reorientation when users did find themselves lost or confused, four used the "back" button to return to their previous location, two returned using the sub-topic list, and three went back using the module menu. One user consulted the map for orientation, and two just continued forward through the links available. One user added her own comment – she checked the control panel to see where she was. This was great news, for orientation was a planned supplementary benefit of the control panel.

System content
Data collected about the content of the system was encouraging, with eight users (73 per cent) reporting to have found the information on diabetes "very useful" (score of 1), and the remaining three (27 per cent) deeming the information "quite useful" (score of 2). Similar numbers were attained about how interesting the information was found to be – seven users (64 per cent) found the information "very interesting" and six (55 per cent) "quite useful".

Balance of media
Regarding which of the various media they would like to see more, users indicated that they felt the media were already well balanced. The inclusion of more video, graphics, quizzes and FAQs would please most users, and almost half would like to see more text. Video was the most popular choice, with nine users (82 per cent) expressing a wish to see more clips in the system, and this was followed by pictures and FAQs (seven users each – 64 per cent). Six users (55 per cent) wished to see more quizzes, and five (45 per cent) more text. The distribution of users' opinions is shown in Table VI. None of the users questioned felt they wanted to see less of any of these elements.

Table VI Matrix of scores awarded for balance of media

User no.	Text	Video	Pictures	FAQs	Quizzes	None
1		●		●		
2		●	●			
3			●			
4	●	●		●	●	
5	●			●	●	
6		●		●		
7	●	●	●		●	
8	●	●	●	●	●	
9		●	●	●	●	
10		●	●			
11	●	●	●	●	●	
Total	5	9	7	7	6	0

Using CAL to learn about diabetes
The majority of users indicated that they felt CAL to be a useful tool for patient education, with 82 per cent of users (n = 9) feeling it to be "very useful". In addition, seven users (64 per cent) said that, "yes, definitely" they would want to learn about diabetes using diabCAL (score of 1). Three users (27 per cent) gave a score of 2 (equating to "yes, probably"), one of whom added that this was "only because I do not like computers". Finally, one user gave a score of 3, but added that this was because "basic knowledge [was] already acquired" (What is Diabetes? and Practical Skills are modules more appropriate to people newly or relatively recently diagnosed).

If it were readily available, eight patients felt they would use the system often or very often. Only three felt they would seldom use the system – one who indicated above that she already had all the basic knowledge presented in these two modules, and two who had given high scores (1 and 2 respectively), indicating they would want to use the system to learn about diabetes. The findings in this section suggest that all the participants felt the system was of some value, even if not directly to themselves. Indeed, all participants agreed that they would recommend the system to someone else with diabetes.

Observation findings
On the basis of observation, specific points were noted at which users got stuck, or where the system misbehaved (due to technical bugs), and specific behaviours were noted, such as how users navigated backwards, and how they reacted to the control panel buttons.

Despite any problems users encountered, these were not sufficient to deter any of them from using the system, and participants were generally enthusiastic. Indeed, one user, who had no previous computer experience, was especially enthusiastic and expressed that, if the system were readily available, she would expect to get great use out of it and compared the system favourably with other patient information available.

Discussion of findings

Overall, users' responses to the system were encouraging; although some participants did struggle initially, all were able to overcome problems, and several were enthusiastic about the experience, and about the prospect of such a system being available for patient use. The observed experiences of users and their subsequent responses suggest that the system is learnable. For example, although locating the module menu had, in the first instance, caused problems for some users, all reported that the method of navigation – using the module menu and the sub-topic list – made sense. Further, scores awarded for the general ease of use of the system were, for the most part, higher (better) than scores for initial ease of use. This finding was confirmed with the observation of users as they browsed the system: initial difficulties were overcome.

In terms of the error rate, users were observed to make some errors (and some errors are to be expected), but recovery from error was found to be generally quite easy. The investigator – on hand and observing users as they browsed – was called upon only a few times to assist; in each case the problem was technical and bugs were therefore identified which required fixing.

For users to be satisfied the system should be pleasant to use, so people should like it (Nielsen, 1993). Most users were, overall, satisfied with the system, and very encouraging responses were seen in terms of how participants felt about using diabCAL to learn about diabetes. One participant in particular, who reported that she was not computer-literate – and indeed had to be shown how to use the mouse – and did not feel at all comfortable with computers, was very enthusiastic. She reported that she would "definitely" use the system again if it were available, and would "definitely" recommend it to someone else with diabetes. She also commented that she "would be very interested to see it when it has been finished; there were other topics I would have liked to have read about". Other informal comments to the researcher indicated similar levels of satisfaction from several participants, and one user, a lecturer in computing, was very complimentary.

In terms of the system tools, the Map, Resources, References and "getting around" pages were deemed invaluable by some. However, the glossary scored poorly for usefulness. This was contrary to expectations, since it was expected that the glossary would be highly valued. It is possible that users simply did not require access to the glossary in a short session such as this (30 minutes) and with the quite basic material that was covered here. Despite users feeling that the glossary is not one of diabCAL's more useful tools, it remains available, if only for the sake of inclusivity.

Modifications made on the basis of user feedback were generally trivial – the evaluation pointed out a few small errors in the text, and highlighted where there were invalid hyperlinks. Similarly, observation of users highlighted a technical flaw in the system map when viewed in a pop-up window, a problem that was easily rectified. Other than the modification of the navigation instructions, on the basis of user feedback, no further fundamental changes were necessary. However, that one participant chose to withdraw because he had such difficulty manipulating the mouse raised the option of touch-screen technology, in order to broaden the appeal of the system to older patients, as a serious item for consideration.

Conclusions

Evaluation is an integral part of the iterative development process employed in creating diabCAL, and the formative evaluations discussed here informed system development as it progressed. These formal evaluations were conducted variously by domain experts, who validated the structure and content of the system, and by representatives of the system's two audiences, who provided vital feedback on usability. Verification of the concept maps, evaluation of navigation and content evaluation have all been important components of the evaluation process. Each has contributed to the shape of the finished prototype modules and has provided evidence in support of the overall system architecture. The usability assessment has contributed both by providing information as to how the system might be improved at the level of formative evaluation, and by contributing at the level of summative evaluation in terms of user acceptance. With the two prototypical modules evaluated in this way, development of further modules can proceed and summative evaluation, looking at usefulness in terms of learning and motivation, can be conducted at a later stage.

References

Bauer, M.D. and Huynh, M.V. (1998), "Nursing students' blood pressure measurement following CD-ROM and conventional classroom instruction: a pilot study", *International Journal of Medical Informatics*, Vol. 50 No. 2, pp. 103-9.

Berridge, E.J., Roudsari, A.V., Taylor, S. and Carey, S. (2000), "Computer-aided learning for the education of patients and family practice professionals in the care of diabetes", *Computer Methods and Programs in Biomedicine*, Vol. 62 No. 3, pp. 191-204.

Bowling, A. (1997), *Research Methods in Health: Investigating Health and Health Services*, Open University Press, Buckingham.

Campaign for Learning (2000), *A National Survey 2000*, Southgate Publishers, London.

Campbell, M.K., Honess-Moreale, L., Farrell, D., Carbone, E. and Brasure, M. (1999), "A tailored multimedia nutrition education pilot program for low-income women receiving food assistance", *Health Education Research*, Vol. 14 No. 2, pp. 257-67.

Carroll, J.M., Stein, C., Byron, M. and Dutram, K. (1996), "Using interactive multimedia to deliver nutrition education to Maine's WIC clients", *Journal of Nutrition Education*, Vol. 28, pp. 19-25.

Chambers, J.K. and Frisby, A.J. (1995), "Computer-based learning for ESRD patient education: current status and future directions", *Advances in Renal Replacement Therapy*, Vol. 2 No. 3.

Cook, M.J. (2000), "Uncovering the attributes of effective clinical leadership: a grounded theory approach", EdD thesis, University of Lincolnshire and Humberside, Lincoln.

Day, J.L., Rayman, G., Hall, L. and Davies, P. (1997), "'Learning Diabetes' – a multimedia learning package for patients' carers and professionals to improve chronic disease management", *Medical Informatics*, Vol. 22 No. 1, pp. 91-104.

Department of Health (DoH) (2001), *National Service Framework for Diabetes: Standards*, DoH, London.

Department of Health (DoH) (2003), *National Service Framework for Diabetes: Delivery Strategy*, DoH, London.

Devitt, P., Smith, J.R. and Palmer, E. (2001), "Improved student learning in ophthalmology with computer-aided instruction", *Eye*, Vol. 15 No. 5, pp. 635-9.

Friedman, C.P. and Wyatt, J. (1997), *Evaluation Methods in Medical Informatics*, Springer Verlag, New York, NY.

Graham, W., Smith, P., Kamal, A., Fitzmaurice, A., Smith, N. and Hamilton, N. (2000), "Randomised controlled trial comparing effectiveness of touch-screen system with leaflet for providing women with information on pre-natal tests", *British Medical Journal*, Vol. 320, pp. 155-60.

Lowe, C.I., Wright, J.L. and Bearn, D.R. (2001), "Computer-aided Learning (CAL): an effective way to teach the Index of Orthodontic Treatment Need (IOTN)?", *J. Orthod.*, Vol. 28 No. 4, pp. 307-11.

Nielsen, J. (1993), *Usability Engineering*, Academic Press, London.

Oppenheim, A.N. (1992), *Questionnaire Design, Interviewing and Attitude Measurement*, Continuum, London.

Sutcliffe, A. (1995), *Human-Computer Interface Design*, 2nd ed., Macmillan, London.

The publication of cancer research papers in high impact journals

Grant Lewison

The author

Grant Lewison is Consultant, Bibliometrics Research Group, Department of Information Science, City University, London, UK. E:mail: g.lewison@soi.city.ac.uk

Keywords

Literature, Research, Cancer, Journals

Abstract

Examines a set of over 27,000 UK papers in cancer research in order to identify the individual factors that influence the impact category of the journals in which they are published, using multiple regression analysis. The most important independent variables that have a positive effect are the numbers of authors and funding bodies, the research level (from clinical to basic), and the presence of certain universities, or of the USA, in the address field. Inter-lab co-operation was shown to have a negative effect on journal impact category, as was international co-authorship. It is because such partnerships usually involve more authors and funding for the research that they are perceived to lead to higher impact work. There is also a tendency for papers to be published in higher impact journals in later years, probably because of market forces, which means that such journals will tend to expand.

Electronic access

The Emerald Research Register for this journal is available at
http://www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at
http://www.emeraldinsight.com/0001-253X.htm

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · pp. 379-387
© MCB UP Limited · ISSN 0001-253X
DOI 10.1108/00012530310498950

Introduction

Research evaluation is currently enjoying a favoured position in many countries as research budgets expand but there is also pressure from funders to ensure value for money (Balter, 2000; Hinde, 1997; Palmerini, 1999; Saegusa, 1999). In several European countries, for example, there is a move to more competitive funding both of laboratories and of individual research projects (Abbott, 1993; Allakhverdov, 1995; Goddard, 2000; Stone, 1996). The ultimate test of the utility of research is that it will give rise to new products and processes or, in the biomedical field, to better health for man and animals. However, the route to these tangible benefits is often lengthy, especially for basic research (Cerf, 1996; Martin and Salter, 1996; Patel *et al.*, 1999), so that proxy indicators are needed to show whether given expenditures have been worthwhile. The main proxy indicator is the esteem in which research is held by other researchers, which can be measured by the counting of citations. However, these suffer from some disadvantages:

- they are somewhat costly to determine – typically about US$1 per paper;
- it takes time for them to accumulate, so that fair comparisons can be made – perhaps five years; and
- comparisons between different fields and sub-fields are difficult because citation norms differ greatly.

An alternative proxy indicator of research quality is the prestige of the journal in which it has been published, which can conveniently be measured, at least in most areas of biomedicine, by citation counts. In effect, the judgements of editors and referees in selecting papers for publication can be used as a measure of quality (Lewison and van Rooyen, 1999). Correspondence between journals' mean citation scores and the actual numbers of citations received by papers (Lewison, 1998) would indicate that the two measures are in reasonable agreement and that a ranking on the basis of the former criterion would be useful as a means to evaluate different groups of research papers.

In some ways, the analysis of the factors that lead to high quality research is comparable with epidemiology. In this subject, the factors that lead to ill-health are analysed. The problem in both analyses is that there may be missing factors, some of which are correlated with the ones used for analysis, and which can confound the apparent conclusions. For example, ill-health is positively associated with smoking, a poor diet, lack of exercise and a low-status job (Clarke *et al.*, 1998; Brunner *et al.*, 1999; Hemingway and Marmot, 1999; Marmot and Bobak, 2000). But each of these factors is strongly associated with the three others and indeed with yet more factors that can plausibly lead to ill-health, such as low income, low education level, poor housing and living in a polluted area. If public health measures are to be soundly based, it is essential that the individual effects of all these factors, and probably many more, are teased out, so that policies can be targeted on the most important ones.

Similarly, the factors that lead to high quality research may plausibly include:

- the subject area of the research;
- whether it is applied or basic (in biomedicine, clinical or basic);
- whether it is carried out in an industrial or academic setting (in biomedicine, in a hospital or a university);
- whether the team of authors is large and multi-disciplinary or small;
- whether there is inter-laboratory collaboration;
- whether there is international collaboration and, if so, with which country or countries;
- whether the research has been reviewed by a peer-review committee for funding and, if so, by how many;
- whether the research has been funded by a particular sector (government, private-non-profit, industry); and
- the city in which the research has been conducted.

It is the aim of this paper to show how such an analysis can be undertaken for one relatively large subject area and group of papers (cancer research in the UK from 1988 to 1998). Although numerical results will be given, they are intended more as illustrative examples to show the general principles of the analysis and to show trends than as definitive values. The results will show in particular the dangers of making judgements on inadequate data and of making inappropriate comparisons. These cannot be too highly stressed. There are increasing numbers of cases where researchers have rejected the results of bibliometric or other quantitative studies, because they do not, in their view, reflect the reality of their situation (Collins, 1991; Williams, 1998). These rejections could prejudice the use of such quantitative studies where they can be useful as a supplement to the subjective views of peer-review committees (Lewison *et al.*, 1999).

The main analysis in the paper is of the potential impact category of the journals in which the papers are published, treated as a proxy indicator of research quality and an "output factor", and how it is influenced by a large number of independent parameters or "input factors". It is correlated with citation scores for groups of papers (Lewison, 1998), but there is inevitably much scatter and it is in effect almost an independent measure of impact. Subsequently the reasons for the changes in many of the parameters of UK oncology research with time (more authors, more collaboration, more funding etc.) are explored by a similar use of regression analysis. This reveals the main drivers behind the changes that have occurred and which ones have not been important.

Methodology

The study was based on a set of 27,189 papers extracted from the Science Citation Index (SCI) and the Social Sciences Citation Index (SSCI) © The Institute for Scientific Information, CD-ROM version, for the years 1988-1998. Articles, notes and reviews were downloaded with an address in the UK and in the field of cancer research. This was defined (Lewison, 1999) by means of lists of specialist journals and title keywords, some in combination. This retrieval strategy or "filter" was developed in association with representatives of the Cancer Research Campaign, a leading UK cancer charity. The bibliographic data from the SCI and SSCI were supplemented by funding data obtained by looking up the papers in libraries. The papers were in fact a sub-set of the Research Outputs Database (ROD), which has been developed by the Wellcome Trust in order to track UK biomedical research and identify papers associated with particular funders (Dawson *et al.*, 1998).

The funding data included the identity of the funder(s), their category (e.g. government agency, charity, foundation, pharmaceutical company), type of funding (e.g. intramural, extramural, personal) and country of the funder. In particular, funders were grouped into three main sectors – UK government, UK private-non-profit, and industrial. The UK addresses were all given their correct postcodes, if they were missing or incorrect in the SCI and SSCI. For the purposes of the current analysis, interest was focused on the first one or two letters of the postcode (e.g. B = Birmingham, CB = Cambridge, EC = London East Central) which designate the city. The setting of the research was characterised as clinical or academic according to whether certain key word contractions (HOSP, INFIRM, NHS for clinical; COLL, SCH, UNIV for academic) were present in the address field. Finally, the papers with foreign addresses were identified and the presence of 11 leading industrial countries was noted for each.

The papers were classified by research level using a system developed by CHI Research Inc. (Narin *et al.*, 1976). They assign a level (1 = clinical observation, 2 = clinical mix, 3 = clinical investigation, 4 = basic research) to almost all journals on the basis of expert opinion and journal-to-journal citation patterns – clinical journals cite ones more basic but not vice versa. The distribution of papers by research level varies greatly according to the sub-field of biomedicine: papers are mostly basic in genetics and mostly clinical in anaesthesiology. In cancer research, there is a good balance with 14 per cent basic research (RL = 4), 30 per cent clinical investigation (RL = 3), 37 per cent clinical mix (RL = 2) and 18 per cent clinical observation (RL = 1). Only 1.3 per cent of papers are unclassified.

The main output measure used was the potential impact category of the journals in which the papers were published, again with four levels. These were based on five-year mean citation scores ($C_{0\text{-}4}$ values) for papers published in given years and were taken from the Journal Expected Citation Rates files (©The Institute for Scientific Information). Papers were grouped into levels according to these values, as shown in Table I. The examples given are the most-frequently used journals in each category; some are specialist cancer journals and some are general journals.

Table I Classification of journals by potential impact category (PIC) according to their five-year mean citation scores, $C_{0\text{-}4}$

PIC	$C_{0\text{-}4}$ values	Examples
1	Below 6	*Brit. J. Urology, Brit. J. Radiology, Clin. Radiology*
2	Between 6 and 11	*Brit. J. Surgery, J. Clin. Pathol., Eur. J. Cancer, Brit. J. Cancer*
3	Between 11 and 20	*Brit. J. Cancer, Int. J. Cancer, Carcinogenesis*
4	Above 20	*Cancer Res., Oncogene, Lancet, Blood*

The appearance of *Brit. J. Cancer* in two categories is not a mistake: the journal changed category, as its citation score dipped below 11 in 1990 and then rose again to more than 15 in 1994. This illustrates the point that journals do vary in their citation impact with time, depending on the editor, the current importance of the subject and their publishing policy.

The "output" or dependent variable in the regression analysis was PIC, which could take the value 1, 2, 3 or 4. The "input" or independent variables used for the analysis were as follows:

- A = number of authors, obtained by counting hyphens in the author field;
- D = number of addresses, one more than the number of slashes in the address field;
- DF = number of non-UK addresses, obtained by subtracting the numbers of addresses in England, Wales, Sotland and Northern Ireland from D;
- F, F2 = number of funding bodies and its square, obtained by counting the number of entries in the funding field;
- YR = year of publication – 1987;
- RL, RL2 and RL3 = research level, its square and its cube (these three coefficients allow for PIC, the dependent variable, having an arbitrary relationship with RL);
- HOSP, ACAD = 1 or 0, depending on the presence of address key contractions;
- MRC, CRC, ICRF = 1 or 0, depending on the presence of three leading funders of cancer research (the Medical Research Council, the Cancer Research Campaign, and the Imperial Cancer Research Fund[1]);
- GOV, PNP, IND, NON = 1 or 0, depending on the presence of UK government, UK private-non-profit, industrial funding or no funding acknowledged;
- 20 postcode areas = 1 or 0, depending on whether they were represented in the postcode(s) for each paper;

- 11 country codes = 1 or 0, depending on whether they were present in the address field.

The numbers of authors, addresses, foreign addresses and funding bodies were limited respectively to 9, 6, 3 and 5, because a few papers had very large values of these parameters and they would have distorted the analysis. Altogether, there were 49 independent variables used in the analysis.

Results

The main results of the analysis are presented in Tables II and III. Table II shows the analysis by the principal non-geographic parameters – authors, addresses, funding and year. The effect of research level is shown as the value of the unstandardised coefficient for each RL, including the constant term; although the coefficients in the cubic equation are all highly significant (< 0.1 per cent), it is not possible to show the statistical significance of each RL value. Overall, the contribution of the independent variables to the explanation of the variance of PIC was 31 per cent. In the Tables, only the statistically significant coefficients are shown.

The effect of research level on PIC should be seen more in terms of the overall distribution of papers than in terms of mean values, as PIC is a categorical variable, albeit one representing a continuum of values. Figure 1 shows that there are big differences between papers at the different research levels.

Table II SPSS analysis of effects of independent variables on PIC: authors (A), addresses (D and DF), funding (F) and individual funders

Parameter	*N* papers	Coefficient	Std error	Significance (%)
Authors, A		0.082	0.003	0.000
Addresses, D		–0.040	0.007	0.000
Foreign addr, DF	6,258	–0.031	0.011	0.613
RL = 1 (clinical)	4,821	0.793		
RL = 2	10,076	0.976		
RL = 3	8,130	1.270		
RL = 4 (basic)	3,817	1.702		
Year, YR		0.022	0.002	0.000
Setting, HOSP	19,064	–0.043	0.013	0.131
Setting, ACAD	16,755	0.070	0.012	0.000
Funding, F		0.093	0.020	0.000
Funding, GOV	5,429	–0.145	0.023	0.000
Funding, IND	3,311	–0.113	0.018	0.000
Funding, NON	9,364	–0.173	0.026	0.000
Funding, MRC	3,427	0.243	0.025	0.000
Funding, CRC	5,363	0.104	0.018	0.000
Funding, ICRF	2,835	0.209	0.021	0.000

Table III SPSS analysis of effects of geographical presence in the address field of UK oncology papers, 1988-1998, on PIC

Parameter	*N* papers	Coefficient	Std error	Significance (%)
London W	2,818	0.125	0.018	0.000
London WC	2,662	0.150	0.019	0.000
London SW	1,915	0.112	0.021	0.000
Oxford OX	1,726	0.131	0.022	0.000
Cambridge CB	1,588	0.144	0.024	0.000
London NW	835	0.156	0.031	0.000
Liverpool L	805	–0.122	0.031	0.009
Bristol BS	732	–0.090	0.033	0.579
USA	2,178	0.250	0.024	0.000

The effect of the number of authors per paper, shown as a coefficient of +0.082 in Table II, is equally dramatic, as Figure 2 shows. It is the strong correlation (Figure 3) between numbers of addresses, D, and numbers of authors, A, and also with the numbers of funders, F, that led to the supposition that more addresses meant higher quality research in earlier work (Narin *et al.*, 1991; Glänzel, 2000). However, the negative coefficient for D in Table II shows clearly that this theory is erroneous. There is also a negative coefficient for DF, although from Table III it appears that collaboration with US researchers is very helpful in terms of publishing in high-impact journals.

In view of the amount of labour involved in looking up every paper to determine its funding, it is reasonable to ask whether the relationships of PIC with the other independent variables shown in Tables II and III actually depend on the availability of funding data. The SPSS analysis was, therefore, repeated with the nine funding variables removed (F and F2; GOV, PNP, IND and NON; MRC, CRC and ICRF). The results for the independent variables are shown in Tables IV and V.

The absence of funding information makes little difference to the relationship between the estimated value of PIC and the non-geographic independent variables: there is naturally a larger coefficient for A but the coefficient of D is still negative and indeed almost unchanged. With regard to the geographical dependence (Table V compared with Table III), there are now several other cities (Manchester, Sutton & Cheam,

Figure 1 Distribution of papers by potential impact category (PIC; 1 = low, 4 = high) for UK oncology papers at four research levels (RL; 1 = clinical, 4 = basic), 1988-1998

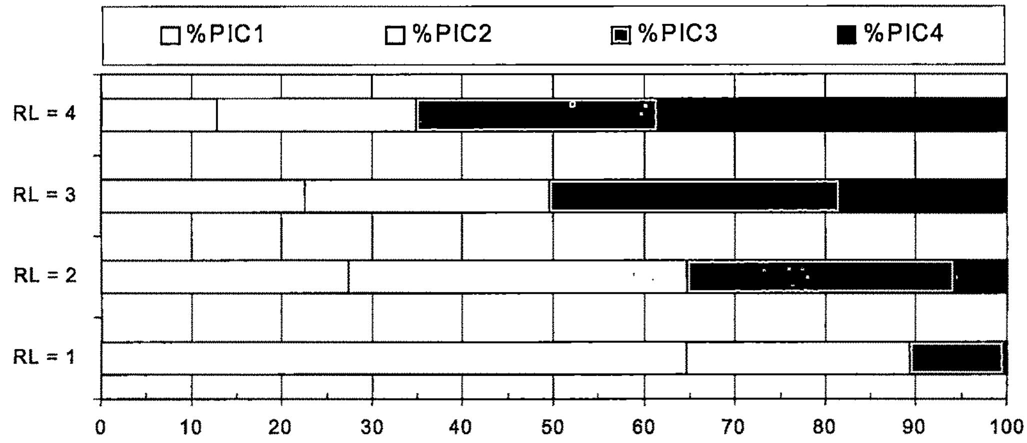


Figure 2 Distribution of papers by potential impact category (PIC; 1 = low, 4 = high) for UK oncology papers with different numbers of authors, A, 1988-1998

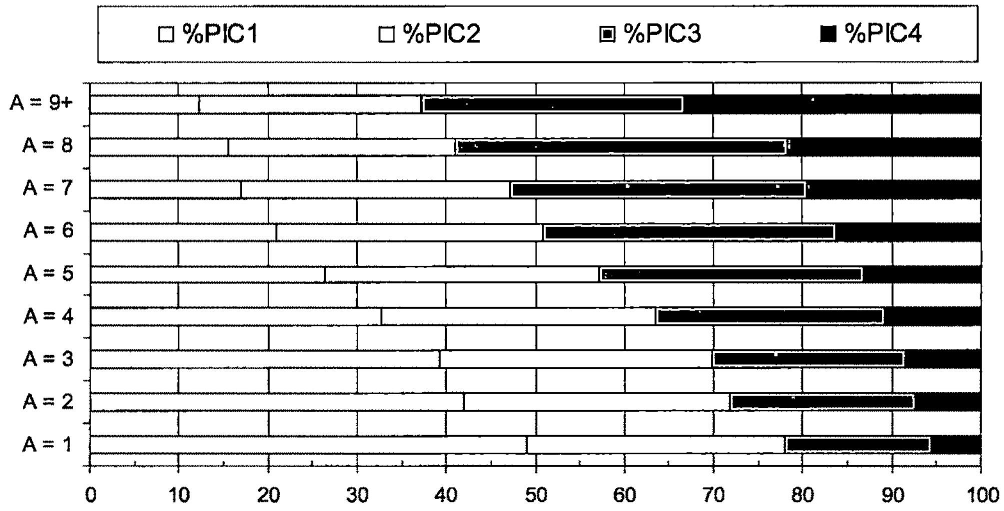


Figure 3 Relationship between numbers of addresses, D, and mean numbers of authors per paper, A, and numbers of funders per paper, F, for UK oncology papers, 1988-1998

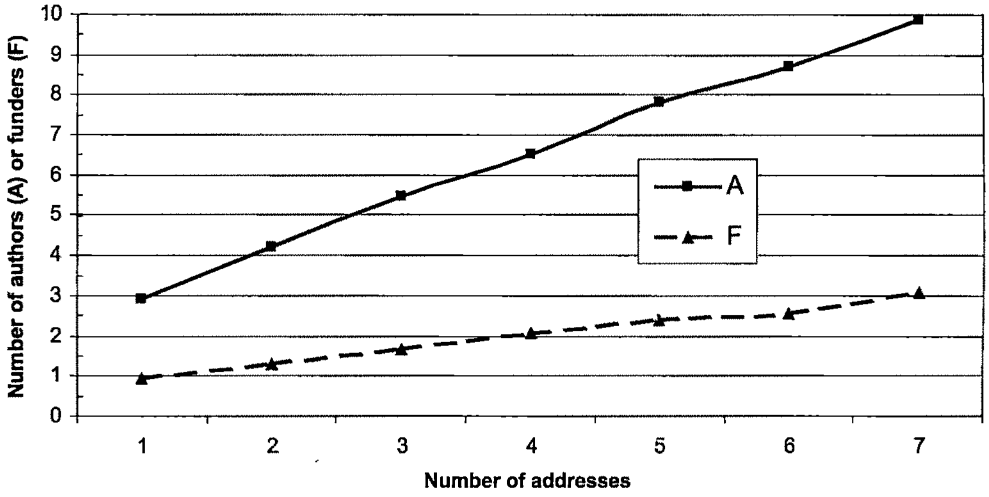


Table IV SPSS analysis of effects of independent variables on PIC: authors (A), addresses (D and DF), research level (RL), time and setting: without funding data

Parameter	*N* papers	Coefficient	Std error	Significance (%)
Authors, A		0.105	0.003	0.000
Addresses, D		−0.039	0.007	0.000
Foreign addr, DF	6,258	-0.012	0.011	n.s.
RL = 1 (clinical)	4,821	1.075		
RL = 2	10,076	1.483		
RL = 3	8,130	1.832		
RL = 4 (basic)	3,817	2.177		
Year, YR		0.020	0.002	0.000
Setting, HOSP	19,064	−0.098	0.013	0.000
Setting, ACAD	16,755	0.087	0.012	0.000

Table V SPSS analysis of effects of geographical presence in the address field of UK oncology papers, 1988-1998, on PIC: without funding data

Parameter	*N* papers	Coefficient	Std error	Significance (%)
London W	2,818	0.171	0.018	0.000
London WC	2,662	0.255	0.019	0.000
London SW	1,915	0.124	0.021	0.000
Manchester M	1,906	0.049	0.022	2.448
Sutton & Cheam SM	1,718	0.105	0.023	0.001
Oxford OX	1,726	0.264	0.022	0.000
Glasgow G	1,601	0.086	0.023	0.027
Cambridge CB	1,588	0.262	0.023	0.000
Edinburgh EH	1,415	0.098	0.025	0.007
Birmingham B	1,315	0.060	0.026	1.826
London NW	835	0.195	0.031	0.000
Liverpool L	805	−0.129	0.032	0.005
Bristol BS	732	−0.094	0.033	0.491
USA	2,178	0.286	0.024	0.000

Glasgow, Edinburgh and Birmingham) that appear to have a positive influence on the PIC values of the oncology papers. This must be because they are successful in gaining external funding for their work and the positive effect on PIC that this brings is visible. However, the cities listed in Table III as having a positive coefficient do well, even when account is taken of their funding success. There are also two cities (Liverpool and Bristol) that appear to have a negative effect on PIC values by their presence in the address field, and this is so, whether or not account is taken of funding data. Again, only the USA appears to have a positive effect by its presence in the address field.

Discussion

The results presented above have provided several important findings:

- The negative effect of numbers of addresses on the impact-category of journals in which research papers are published, which was found for gastroenterology, also applies to the larger field of cancer research.
- International collaboration (except with the USA) also has a negative impact on journal impact category, mainly because the apparently positive effect is actually attributable to the additional funding, which more than counters the negative effect of collaboration across frontiers.
- Clinicians tend to publish their papers in journals of much lower impact category than basic researchers in a field and this should be taken fully into account when comparisons between groups are being made. In particular, cancer research in hospitals is published in lower impact journals than ones from academia.
- The number of authors on a paper plays a major role in determining the impact category of the journal in which it is likely to be published.
- There is a small but positive drift in the impact category of journals in which cancer research is being published, probably because of the tendency for highly cited journals to increase in size and vice versa.
- It is possible to compare the outputs of research from different cities (read, universities) on a fair basis and to identify those whose work is of a superior standard and those whose work appears to be of lower potential impact. However, such distinctions depend to some extent on a university's success in gaining external funding, which could also be seen as an outcome measure.

Although the data set has been used to evaluate PIC as an output measure, we can also use it to investigate the causes behind the steady change in the character of UK oncology research with time seen in Table VI.

Evidently the research has become more multi-disciplinary, slightly more basic, with more papers specifically funded and much more foreign collaboration. Each of these variables can be considered as being the dependent variable, with all the others, as well as setting, year and number of addresses, being the independent variables. The results for authors, funding level, research level and foreign collaboration in turn are shown in Tables VII to X.

The main drivers behind the increase in team size have been the need to get funding (more F) and more collaboration, particularly in the UK (more D, but DF not important). Research level plays little part but clinical team sizes seem to have increased more than basic ones.

This shows that the primary drivers behind the apparent increase in funding are the larger research teams and increased foreign collaboration, and that funding has not inherently been more plentiful in recent years. Academics are more likely to be funded than clinicians in hospitals and there is a strong preference by funders for work at clinical investigation level, followed by basic research.

The effect of collaboration on research level is divided: foreign collaboration tends to make it more basic but domestic collaboration is more clinical. Not surprisingly, hospital settings lead to more clinical work and academic ones to more basic work. But the biggest driver has been funding: the receipt of specific funding seems to make the work much more basic.

The biggest influence on foreign collaboration has been the growing practice of domestic collaboration. The research level has had rather little influence, although basic research is more likely to lead to foreign collaboration, as is work in academia.

Table VI Variation with time of parameters associated with UK oncology research: authorship, A; funding, F; foreign collaboration, DF and research level, RL

Period	Papers	Mean A	Mean F	Mean DF	Mean RL
1988-1990	6,549	4.06	1.17	0.36	2.28
1991-1993	7,550	4.50	1.40	0.53	2.34
1994-1996	8,116	5.07	1.54	0.73	2.44
1997-1998	4,974	5.37	1.66	0.94	2.47

Table VII SPSS analysis of effects of independent variables on team size (authors per paper, A)

Parameter	Coefficient	Std error	Significance (%)
Year, YR	0.034	0.003	0.000
Addresses, D	0.997	0.010	0.000
Foreign addr, DF	–0.001	0.016	n.s.
Funding, F	0.476	0.019	0.000
Funding^2, F2	–0.046	0.004	0.000
Setting, HOSP	0.244	0.025	0.000
Setting, ACAD	–0.064	0.022	0.358
RL = 1 (clinical)	1.098		
RL = 2	1.320		
RL = 3	1.431		
RL = 4 (basic)	1.254		

Table VIII SPSS analysis of effects of independent variables on funding level (funders per paper, F)

Parameter	Coefficient	Std error	Significance (%)
Authors, A	0.148	0.004	0.000
Addresses, D	0.078	0.009	0.000
Foreign addr, DF	0.306	0.012	0.000
Year, YR	0.003	0.002	n.s.
Setting, HOSP	–0.423	0.018	0.000
Setting, ACAD	0.127	0.017	0.000
RL = 1 (clinical)	0.166		
RL = 2	0.663		
RL = 3	1.593		
RL = 4 (basic)	0.931		

Table IX SPSS analysis of effects of independent variables on research level (RL)

Parameter	Coefficient	Std error	Significance (%)
Authors, A	0.021	0.003	0.000
Addresses, D	–0.078	0.006	0.000
Foreign addr, DF	0.094	0.008	0.000
Year, YR	0.010	0.002	0.000
Funding, F	0.412	0.010	0.000
Funding^2, F2	–0.050	0.002	0.000
Setting, HOSP	–0.498	0.012	0.000
Setting, ACAD	0.107	0.011	0.000

Table X SPSS analysis of effects of independent variables on foreign collaboration (foreign addresses per paper, DF)

Parameter	Coefficient	Std error	Significance (%)
Authors, A	0.000	0.002	n.s.
Addresses, D	0.395	0.004	0.000
Year, YR	0.005	0.001	0.035
Funding, F	–0.059	0.007	0.000
Funding^2, F2	0.030	0.001	0.000
RL = 1 (clinical)	–0.534		
RL = 2	–0.503		
RL = 3	–0.402		
RL = 4 (basic)	–0.373		
Setting, HOSP	–0.187	0.010	0.000
Setting, ACAD	0.082	0.009	0.000

It is worth noting that nearly all the coefficients in the Tables are highly statistically significant, because the data set is so large. It is likely that similar associations would be found for smaller data sets, e.g. in more specialist sub-fields or with papers from smaller countries. It is recommended that more analyses of research output should be conducted on a multi-factorial basis in order to elucidate the important underlying factors; this can probably be done satisfactorily provided that the data set contains at least several thousand papers.

Note

1 The Cancer Research Campaign and the Imperial Cancer Research Fund have now merged to form Cancer Research UK.

References

Abbott, A. (1993), "Czechs revise policy on research funding, aim for a more western approach. Prague institute leads the way", *Nature*, Vol. 361 No. 6408, pp. 104-5.

Allakhverdov, A. (1995), "Russian science: president's council lambastes ministry", *Science*, Vol. 268 No. 5216, p. 1426.

Balter, M. (2000), "New chief promises renewal and openness", *Science*, Vol. 287 No. 5453, p. 567.

Brunner, E., Shipley, M.J., Blane, D., Smith, G.D. and Marmot, M.G. (1999), "When does cardiovascular risk start? Past and present socio-economic circumstances and risk-factors in adulthood", *Journal of Epidemiology and Community Health*, Vol. 53, pp. 757-64.

Cerf, V.G. (1996), "Research pays off", *Science*, Vol. 271 No. 5243, 8 March, p. 1343.

Clarke, R., Breeze, E., Sherliker, P., Shipley, M., Youngman, L., Fletcher, A., Fuhrer, R., Leion, D., Parish, S., Collins, R. and Marmot, M. (1998), "Design, objectives, and lessons from a pilot 25-year follow-up re-survey of survivors in the Whitehall study of London Civil Servants", *Journal of Epidemiology and Community Health*, Vol. 52 No. 6, pp. 364-9.

Collins, P.M.D. (1991), *Quantitative Assessment of Departmental Research: A Survey of Academics' Views*, SEPSU Policy Study No. 5, the Royal Society/ Fellowship of Engineering, London.

Dawson, G., Lucocq, B., Cottrell, R. and Lewison, G. (1998), *Mapping the Landscape: National Biomedical Research Outputs 1988-1995*, Policy Report No. 9, The Wellcome Trust, London.

Glänzel, W. (2000), "Science in Scandinavia: a bibliometric approach", *Scientometrics*, Vol. 48, June, pp. 121-50.

Goddard, A. (2000), "Research faces big overhaul", *THES*, 1 September, p. 4.

Hemingway, H. and Marmot, M. (1999), "Evidence-based cardiology – psychosocial factors in the aetiology and prognosis of coronary heart disease – systematic review of prospective cohort studies", *British Medical Journal*, Vol. 318, p. 1460.

Hinde, J. (1997), "Institutes' research pays", *THES*, 4 July, p. 7.

Lewison, G. (1998), "Gastroenterology research in the United Kingdom: funding sources and impact", *Gut*, Vol. 43, August, pp. 288-93.

Lewison, G. (1999), "The definition and calibration of biomedical subfields", *Scientometrics*, Vol. 46 No. 3, pp. 529-37.

Lewison, G. and van Rooyen, S. (1999), "Reviewers' and editors' perceptions of submitted manuscripts with different numbers of authors, addresses and funding sources", *Journal of Information Science*, Vol. 25 No. 6, pp. 509-11.

Lewison, G., Cottrell, R. and Dixon, D. (1999), "Bibliometric indicators to assist the peer review process in grant decisions", *Research Evaluation*, Vol. 8 No. 1, pp. 47-52.

Marmot, M. and Bobak, M. (2000), "International comparators and poverty and health in Europe", *British Medical Journal*, Vol. 321, pp. 1124-8.

Martin, B. and Salter, A. (1996), *The Relationship between Publicly Funded Basic Research and Economic Performance*, report for HM Treasury, Science Policy Research Unit, University of Sussex.

Narin, F., Pinski, G. and Gee, H.H. (1976), "Structure of the biomedical literature", *Journal of the American Society of Information Science*, Vol. 27, pp. 25-45.

Narin, F., Stevens, K. and Whitlow, E.S. (1991), "Scientific co-operation in Europe and the citation of multinationally authored papers", *Scientometrics*, Vol. 21 No. 3, pp. 313-24.

Palmerini, C. (1999), "Italy: university funding to be tied to performance", *Science*, Vol. 284 No. 5415, 30 April, pp. 725-6.

Patel, K., Thomson, A., Tysome, T., Utley, A. and Wojtas, O. (1999), "Nurturing the creative", *THES*, 3 December, p. 6.

Saegusa, A. (1999), "Japanese labs balk at bid to boost external evaluation", *Nature*, Vol. 397 No. 6718, 4 February, p. 378.

Stone, R. (1996), "Estonian researchers lead the way in science reform", *Science*, Vol. 273 No. 5284, 4 October, pp. 29-30.

Williams, G. (1998), "Misleading, unscientific and unjust: the United Kingdom's research assessment exercise", *British Medical Journal*, Vol. 316, pp. 1079-82.

Literati Club

Awards for Excellence

Andrew Boyd
City University, London, UK

is the recipient of the Journal's Outstanding Paper Award for Excellence for his paper

"The goals, questions, indicators, measures (GQIM) approach to the measurement of customer satisfaction with e-commerce Web sites"

which appeared in ***Aslib Proceedings: New Information Perspectives***, Vol. 54 No. 3, 2002

Andrew Boyd is currently pursuing a PhD at City University, where he is researching multi-source, multi-channel information-seeking behaviour within organisations. As a research student with the Centre for Information Behaviour and the Evaluation of Research (CIBER), he is a frequent contributor to ***Aslib Proceedings*** as well as to practitioner publications such as ***Content Management Focus, Knowledge Management*** and ***IT Consultant***.

He has ten years' experience in strategic consultancy and technology management – specialising in the development of reporting and management information systems. He received his Master of Science in Information Systems from Drexel University and holds a Bachelor of Business Administration from Temple University.

Aslib Proceedings
Volume 55 · Number 5/6 · 2003 · 389-392

Author and title index
Volume 55, 2003

Issue & page

A

Abdullah, R., see *Cox, A.*

3, p. 130 Accountability and demonstration of the value of information services in South African law firms
Garratt, O. and *du Toit, A.*

3, p. 181 After the disaster: drawing up the insurance claim
Howes, R.

5/6, p. 320 Availability and use of information touch-screen kiosks (to facilitate social inclusion)
Boudioni, M.

B

Banyard, P., see *Joinson, A.N.*

5/6, p. 367 ***Berridge, E.-J.*** and *Roudsari, A.V.*
diabCAL: evaluating computer-aided learning for diabetes patient education

1/2, p. 32 Beyond outputs: new measures of biomedical research impact
Lewison, G.

5/6, p. 320 ***Boudioni, M.***
Availability and use of information touch-screen kiosks (to facilitate social inclusion)

5/6, p. 261 (The) British and their use of the Web for health information and advice: a survey
Nicholas, D., Huntington, P., Gunter, B., Russell, C. and *Withey, R.*

4, p. 203 (The) British Life and Internet Project: inaugural survey findings
Gunter, B., Russell, C., Withey, R. and *Nicholas, D.*

C

4, p. 193 Can remote Internet voting increase turnout?
Henry, S.

5/6, p. 277 Characterising and profiling health Web user and site types: going beyond "hits"
Huntington, P., Nicholas, D. and *Williams, P.*

3, p. 117 ***Chua, A.***
Knowledge sharing: a game people play

4, p. 234 ***Cloete, M.*** and *Snyman, R.*
The enterprise portal – is it knowledge management?

4, p. 223 ***Cloete, L.M.,*** *Snyman, R.* and *Cronjé, J.C.*
Training cataloguing students using a mix of media and technologies

1/2, p. 52 Comparing the use of two DiTV transmission services: same service, different outcomes
Huntington, P., Nicholas, D. and *Williams, P.*

3, p. 155 ***Cox, A.*** and *Yeates, R.*
Library portal solutions

4, p. 243 ***Cox, A.,*** *Patrick, K.* and *Abdullah, R.*
Seeding a community of interest: the experience of the knowledge library project

Cronjé, J.C., see *Cloete, L.M.*

D

5/6, p. 357 ***Dandy, J.***
Public awareness of patient rights, consent forms and advance statements

5/6, p. 367 diabCAL: evaluating computer-aided learning for diabetes patient education
Berridge, E.-J. and *Roudsari, A.V.*

1/2, p. 23 Digital information consumers, players and purchasers: information-seeking behaviour in the new digital interactive environment
Nicholas, D., Dobrowolski, T., Withey, R., Russell, C., Huntington, P. and *Williams, P.*

1/2, p. 43 Digital information provision via interactive television: understanding the digital consumer
Gunter, B.

5/6, p. 346 Digital interactive television: health information platform of the future?
Gunter, B., Nicholas, D., Huntington, P. and *Williams, P.*

1/2, p. 84 Digital journals, Big Deals and online searching behaviour: a pilot study
Nicholas, D., Huntington, P. and *Watkinson, A.*

Dobrowolski, T., see *Nicholas, D.*

du Toit, A., see *Garratt, O.*

E

3, p. 166 E-mail overload in the UK workplace
Ingham, J.

4, p. 234 (The) enterprise portal – is it knowledge management?
Cloete, M. and *Snyman, R.*

F

3, p. 138 First steps towards providing the UK with health-care information and advice via their television sets: an evaluation of four Department of Health-sponsored pilot services
Nicholas, D., Huntington, P., Williams, P. and *Gunter, B.*

G

3, p. 130 ***Garratt, O.*** and *du Toit, A.*
Accountability and demonstration of the value of information services in South African law firms

1/2, p. 43 ***Gunter, B.***
Digital information provision via interactive television: understanding the digital consumer

Gunter, B., see *Nicholas, D.*

5/6, p. 346 ***Gunter, B.,*** *Nicholas, D., Huntington, P.* and *Williams, P.*
Digital interactive television: health information platform of the future?

4, p. 203 ***Gunter, B.,*** *Russell, C., Withey, R.* and *Nicholas, D.*
The British Life and Internet Project: inaugural survey findings

H

Harrison, J., see *Hepworth, M.*

5/6, p. 304 Health information on the Internet: a qualitative study of NHS Direct Online users
Williams, P., Huntington, P. and *Nicholas, D.*

4, p. 193 ***Henry, S.***
Can remote Internet voting increase turnout?

5/6, p. 290 ***Hepworth, M.,*** *Harrison, J.* and *James, N.*
Information needs of people with multiple sclerosis and the implications for information provision based on a national UK survey

1/2, p. 64 Home electronic health information for the consumer: user evaluation of a DiTV video-on-demand service
Williams, P., Nicholas, D. and *Huntington, P.*

3, p. 181 ***Howes, R.***
After the disaster: drawing up the insurance claim

5/6, p. 277 ***Huntington, P.,*** *Nicholas, D. and Williams, P.*
Characterising and profiling health Web user and site types: going beyond "hits"

1/2, p. 52 ***Huntington, P.,*** *Nicholas, D.* and *Williams, P.*
Comparing the use of two DiTV transmission services: same service, different outcomes

Huntington, P., see *Gunter, B.*

Huntington, P., see *Nicholas, D.*

Huntington, P., see *Williams, P.*

I

1/2, p. 13 Information metrics and user studies
Tenopir, C.

5/6, p. 290 Information needs of people with multiple sclerosis and the implications for information provision based on a national UK survey
Hepworth, M., Harrison, J. and *James, N.*

3, p. 166 ***Ingham, J.***
E-mail overload in the UK workplace

J

James, N., see *Hepworth, M.*

5/6, p. 313 ***Joinson, A.N.*** and *Banyard, P.*
Seeking alcohol information on the Internet

5/6, p. 334 ***Jones, R.***
Making health information accessible to patients

K

1/2, p. 5 Knowledge production, consumption and impact: policy indicators for a changing world
Rowlands, I.

3, p. 117 Knowledge sharing: a game people play
Chua, A.

L

1/2, p. 32 ***Lewison, G.***
Beyond outputs: new measures of biomedical research impact

5/6, p. 379 **_Lewison, G._**
The publication of cancer research papers in high impact journals

3, p. 155 Library portal solutions
Cox, A. and *Yeates, R.*

M

4, p. 217 **_MacFarlane, A._**
On open source IR

5/6, p. 339 **_McWhirter, G._**
The potential for using hospital bedside TV services in England to provide patients with access to health information

5/6, p. 334 Making health information accessible to patients
Jones, R.

1/2, p. 18 (Mis)understanding the digital media revolution
Withey, R.

1/2, p. 75 Modelling the diffusion of specialised knowledge
Warner, J.

N

1/2, p. 23 **_Nicholas, D._**, *Dobrowolski, T.*, *Withey, R.*, *Russell, C.*, *Huntington, P.* and *Williams, P.*
Digital information consumers, players and purchasers: information-seeking behaviour in the new digital interactive environment

1/2, p. 84 **_Nicholas, D._**, *Huntington, P.* and *Watkinson, A.*
Digital journals, Big Deals and online searching behaviour: a pilot study

5/6, p. 261 **_Nicholas, D._**, *Huntington, P.*, *Gunter, B.*, *Russell, C.* and *Withey, R.*
The British and their use of the Web for health information and advice: a survey

3, p. 138 **_Nicholas, D._**, *Huntington, P.*, *Williams, P.* and *Gunter, B.*
First steps towards providing the UK with health-care information and advice via their television sets: an evaluation of four Department of Health-sponsored pilot services

Nicholas, D., see *Gunter, B.*

Nicholas, D., see *Huntington, P.*

Nicholas, D., see *Williams, P.*

O

4, p. 217 On open source IR
MacFarlane, A.

P

Patrick, K., see *Cox, A.*

5/6, p. 339 (The) potential for using hospital bedside TV services in England to provide patients with access to health information
McWhirter, G.

5/6, p. 357 Public awareness of patient rights, consent forms and advance statements
Dandy, J.

5/6, p. 379 (The) publication of cancer research papers in high impact journals
Lewison, G.

R

Roudsari, A.V., see *Berridge, E.-J.*

1/2, p. 5 **_Rowlands, I._**
Knowledge production, consumption and impact: policy indicators for a changing world

Russell, C., see *Gunter, B.*

Russell, C., see *Nicholas, D.*

S

4, p. 243 Seeding a community of interest: the experience of the knowledge library project
Cox, A., *Patrick, K.* and *Abdullah, R.*

5/6, p. 313 Seeking alcohol information on the Internet
Joinson, A.N. and *Banyard, P.*

Snyman, R., see *Cloete, L.M.*

Snyman, R., see *Cloete, M.*

T

1/2, p. 13 **Tenopir, C.**
Information metrics and user studies

4, p. 223 Training cataloguing students using a mix of media and technologies
Cloete, L.M., *Snyman, R.* and *Cronjé, J.C.*

W

1/2, p. 75 **_Warner, J._**
Modelling the diffusion of specialised knowledge

Watkinson, A., see *Nicholas, D.*

Williams, P., see *Gunter, B.*

Williams, P., see *Huntington, P.*

Williams, P., see *Nicholas, D.*

5/6, p. 304 ***Williams, P.,*** *Huntington, P.* and Nicholas, D.
Health information on the Internet: a qualitative study of NHS Direct Online users

1/2, p. 64 ***Williams, P.,*** *Nicholas, D.* and *Huntington, P.*
Home electronic health information for the consumer: user evaluation of a DiTV video-on-demand service

1/2, p. 18 ***Withey, R.***
(Mis)understanding the digital media revolution

Withey, R., see *Gunter, B.*

Withey, R., see *Nicholas, D.*

Y

Yeates, R., see *Cox, A.*

Notes for contributors

Aslib Proceedings: New Information Perspectives

Copyright

Articles submitted to the journal should be original contributions and should not be under consideration for any other publication at the same time. Authors submitting articles for publication warrant that the work is not an infringement of any existing **copyright** and will indemnify the publisher against any breach of such warranty. For ease of dissemination and to ensure proper policing of use, papers and contributions become the legal copyright of the publisher unless otherwise agreed. Articles should be submitted by e-mail or on disc to:

The Editor
Professor David Nicholas, Head of Department,
Department of Information Science, City University,
Northampton Square, London EC1V 0HB, UK.
E-mail: nicky@soi.city.ac.uk

Editorial objectives

Aslib Proceedings: New Information Perspectives brings currency, authority and accessibility to the reporting of current research, issues and debates in the broad area of information work. Above all, the journal wishes to provide research and comment in a form that is easily and quickly understood: a fresh, rigorous, but unfussy, writing style is what is aimed for. The needs of busy practitioners (and academics) are very much in mind. Articles are refereed to meet the need for accredited and authoritative information. To ensure that this does not result in an unacceptable loss of currency, articles are speedily refereed by the journal's large, eminent and multi-disciplinary Editorial Board (assembled for just such a purpose). In some cases they may be referred to an external panel of consultants. The submission of research in progress articles is encouraged.

Final submission checklist

- Accurate, checked hard copy
- Abstracts and keywords
- Correct, complete Harvard references
- Figures and illustrations in electronic and hard copy form
- Text on labelled disk or CD-ROM or as attached file if requested by editor
- Completed/signed journal article record form

The boundaries of information work are rapidly changing and widening. *Aslib Proceedings* has a role to play in the repositioning of the information profession by encouraging submissions from information managers, providers, packagers and consumers of all kinds – and especially those from the related fields of journalism, electronic publishing, communication and Internet studies.

Manuscript requirements

As a guide, articles should be between 2,000 and 8,000 words in **length.** A **title** of not more than eight words should be provided. A brief **autobiographical note** should be supplied including full name, affiliation, e-mail address and full international contact details. Authors must supply an **abstract** of 100-150 words. Up to six **keywords** should be included which encapsulate the principal subjects covered by the article.

Where there is a **methodology**, it should be clearly described under a separate heading. **Headings** must be short, clearly defined and not numbered. **Notes** or **Endnotes** should be used only if absolutely necessary and must be identified in the text by consecutive numbers, enclosed in square brackets and listed at the end of the article.

All **Figures** (charts, diagrams and line drawings) and **Plates** (photographic images) should be submitted in both electronic form and hard copy originals. Figures should be of clear quality, black and white and numbered consecutively with arabic numerals.

Electronic figures should be either copied and pasted or saved and imported from the origination software into a blank Microsoft Word document. Figures created in MS Powerpoint are also acceptable. Acceptable standard image formats are: .eps, .pdf, .ai and .wmf. If you are unable to supply graphics in these formats then please ensure they are .tif, .jpeg, .bmp, .pcx, .pic, .gif or .pct at a resolution of at least 300dpi and at least 10cm wide. To prepare **screenshots** simultaneously press the "Alt" and "Print screen" keys on the keyboard, open a blank Microsoft Word document and simultaneously press "Ctrl" and "V" to paste the image. (Capture all the contents/windows on the computer screen to paste into MS Word, by simultaneously pressing "Ctrl" and "Print screen".)

For photographic images (plates) good quality original photographs should be submitted. If supplied electronically they should be saved as .tif or .jpeg files at a resolution of at least 300dpi and at least 10cm wide. Digital camera settings should be set at the highest resolution/quality as possible.

In the text of the paper the preferred position of all figures and plates should be indicated by typing on a separate line the words "Take in Figure (No.)" or "Take in Plate (No.)". Supply succinct and clear captions for all figures and plates.

Tables must be numbered consecutively with roman numerals and a brief title. In the text, the position of the table should be shown by typing on a separate line the words "Take in Table IV".

References to other publications must be in Harvard style and carefully checked for completeness, accuracy and consistency. This is very important in an electronic environment because it enables your readers to exploit the Reference Linking facility on the database and link back to the works you have cited through CrossRef. You should include all author names and initials and give any journal title in full.

You should cite publications in the text: (Adams, 1997) using the first named author's name. At the end of the paper a reference list in alphabetical order should be supplied:

For books: surname, initials, (year), *title of book*, publisher, place of publication, e.g. Fallbright, A. and Khan, G. (2001), *Competing Strategies*, Outhouse Press, Rochester.

For book chapters: surname, initials, (year), "chapter title", editor's surname, initials, *title of book*, publisher, place of publication, pages, e.g. Bessley, M. and Wilson, P. (1999), "Marketing for the production manager", in Levicki, J. (Ed.), *Taking the Blinkers off Managers*, Broom Relm, London, pp.29-33.

For journals: surname, initials, (year), "title of article", *journal name*, volume, number, pages, e.g. Greenwald, E. (2000), "Empowered to serve", *Management Decision*, Vol. 33 No. 5, pp. 6-10.

For electronic sources: if available online the full URL should be supplied at the end of the reference.

Final submission of the article

Once accepted for publication, the final version of the manuscript must be provided, accompanied by a 3.5" **disk, Zip disk** or **CD-ROM** of the same version labelled with: disk format (Macintosh or PC); author name(s); title of article; journal title; file name.

Alternatively, the editor may request the final version as an attached file to an e-mail.

Each article must be accompanied by a completed and signed **Journal Article Record Form** available from the Editor or on http://www.emeraldinsight.com/literaticlub/jarforms.htm

The manuscript will be considered to be the definitive version of the article. The author must ensure that it is complete, grammatically correct and without spelling or typographical errors.

In preparing the disk, please use one of the following preferred formats: Word, Word Perfect, Rich text format or TeX/LaTeX.

Technical assistance is available from Emerald's Literati Club on http://www.emeraldinsight.com/literaticlub or by contacting Mike Massey at Emerald, e-mail: mmassey@emeraldinsight.com

Aslib Proceedings

New Information Perspectives

Volume 55 Number 5/6 2003
In 2003 this journal will consist of 6 printed issues delivered in 5 despatches
+ Internet Online Publishing with Archive, Active Reference Linking, Emerald WIRE, Key Readings,
Research Register, Non-article Content, Institution-wide Licence, E-mail Alerting Service and Usage Statistics

Contents

Number 5/6

Health informatics: inter-disciplinary and multi-disciplinary perspectives
Guest Editors: Peter Williams and Paul Huntington

254 Access this journal online

255 Abstracts & keywords

258 Guest editorial

261 The British and their use of the Web for health information and advice: a survey
David Nicholas, Paul Huntington, Barrie Gunter, Chris Russell and Richard Withey

277 Characterising and profiling health Web user and site types: going beyond "hits"
Paul Huntington, David Nicholas and Peter Williams

290 Information needs of people with multiple sclerosis and the implications for information provision based on a national UK survey
Mark Hepworth, Janet Harrison and Nicole James

304 Health information on the Internet: a qualitative study of NHS Direct Online users
Peter Williams, Paul Huntington and David Nicholas

313 Seeking alcohol information on the Internet
Adam N. Joinson and Phil Banyard

320 Availability and use of information touch-screen kiosks (to facilitate social inclusion)
Markella Boudioni

334 Making health information accessible to patients
Ray Jones

339 The potential for using hospital bedside TV services in England to provide patients with access to health information
Gavin McWhirter

346 Digital interactive television: health information platform of the future?
Barrie Gunter, David Nicholas, Paul Huntington and Peter Williams

357 Public awareness of patient rights, consent forms and advance statements
Julia Dandy

367 diabCAL: evaluating computer-aided learning for diabetes patient education
Emma-Jane Berridge and A.V. Roudsari

379 The publication of cancer research papers in high impact journals
Grant Lewison

388 Awards for Excellence

389 Author and title index to volume 55, 2003

www.emeraldinsight.